

# THE National Telephone Journal

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## TELEPHONE MEN.

### XLVII.—CHARLES ERNEST FENTON.

CHARLES ERNEST FENTON was born in 1870 at Bromsgrove, a market town midway between Birmingham and Worcester. He was educated first at a school situate amongst the Lickey Hills, afterwards at a public school at Bromsgrove, and subsequently his studies were continued at Birmingham.

The first few years of his business life were spent in the offices of Messrs. Lea & Levens, estate agents and accountants, of Bromsgrove, but his first acquaintance with the telephone began when he entered the service of the old National Company at Birmingham in December, 1888, as a Junior Clerk under Mr. Cotterell, and in a few months was promoted to the position of Clerk to Mr. Coleman, then General Manager for the Midland Counties, in which capacity he gained a varied experience. At that period each local office in the Midland Counties was responsible for the monthly returns to Head Office, and with the object of improving his knowledge Mr. Fenton frequently assisted the local staff in the preparation of their returns after the ordinary office hours.

As the business extended and the territory increased he visited the outlying centres at intervals for the purpose of auditing the accounts and checking off the stock, and at times did relief duty.

When the South of England Company was absorbed by the National, Mr. Fenton was sent to one of the centres which had been attached to the Midland Counties district to report on the records there. It was somewhat of a shock to him to discover that the receptacle for the cash was the manager's hip pocket—a method hardly in accordance with standard practice.

When it was decided to centralise at Birmingham, with one or two exceptions the accounts of the local offices in the Midland

Counties, the work was entrusted to Mr. Fenton and it was accomplished when the general re-organisation of 1893 took place.

In 1892 the Company opened its Aston Works, and the supervision of the accounts there first brought him in contact with the manufacturing and repairing processes.

In June, 1893, Mr. Fenton was transferred to the Head Office travelling audit staff, and spent some time in various districts straightening up the accounts, a standard system of bookkeeping having been brought into force. These duties gave him an opportunity of visiting most of the districts throughout the United Kingdom.

In 1894, during his holidays, Mr. Fenton received a letter from Mr. Anns requesting him to speak to him from the nearest call office on an urgent matter. This proved to be the offer of a position to take control of the bookkeeping at the newly opened Nottingham Factory, the works at Aston having been closed, and operations on a more extensive scale commenced at Nottingham under the management of Mr. J. W. Ullett.

Mr. Fenton on accepting the post encountered and overcame much uphill work, which entailed three months' solid work, early and late.

Soon after he was settled in his new position he married the daughter of Mr. Philip Levens, his former employer.

In order to cope with increased business additional works were established at Beeston in 1901 for manufacturing purposes, the repairing work being retained at Nottingham Factory. The offices

were transferred to Beeston and the two establishments were controlled from there under Mr. Ullett's management, which brought Mr. Fenton increased responsibilities.

With a view to applying the American card index system of





accounting to the new works, he visited several large engineering establishments for the purpose of acquiring information. He worked out a scheme, which was approved by Head Office, and which involved the displacement of the whole of the books and forms by cards, time recorders, adding and listing machine, and other labour-saving appliances. The results which followed justified the innovation.

In December, 1903, when the Beeston Works were taken over by the British Ericsson Company, Mr. Fenton was appointed Manager of Nottingham Factory to devote his energies to repairing work, thus severing, to his regret, his long and happy association with Mr. Ullett. Two years later an adjacent factory was taken to meet the increased demands, when the departments were specialised and the various operations subdivided, with satisfactory results.

Mr. Fenton's spare time is devoted to photography and flower gardening, but Mr. Fenton's greatest interest is in the factory and its staff of between 500 and 600. He has occupied the position of president of the Factory Telephone Society since its inception, and takes an active and also pleasurable part in all movements connected with the welfare of the staff. Indeed, although he is firm in all matters of discipline he has the interests of the workers truly at heart.

In connection with factory work Mr. Fenton has strong ideas in favour of the payment of wages on the bonus system, with a special premium on all work passed by the test room without rejection. It is one of his great hopes, when telephone affairs are in a more settled state, to see a well-equipped school attached to the factory in which practical and theoretical instruction can be given to all learners for a short period prior to entering the workshops; also a scheme whereby the learners, after satisfactory service in the various departments and some distinction in connection with the Telephony Classes, can be drafted into the districts to take up positions there, some of them subsequently to return to the factory to fill superior positions, in which their knowledge of the actual working conditions of the apparatus would be of incalculable benefit. It is his belief that such arrangements would be beneficial to the telephone service, and that learners would have a real incentive to flout.

## SERVICE INSTRUCTIONS AND DISCRETION.\*

BY EUSTACE HARE.

IN a paper entitled "Control" which I read to the Telephone Society of London a few months ago I said this: "Organise as you will, issue your service instructions by the ream . . . and you will still find scope for personal discretion and responsibility, to say nothing of individual lapses and errors of judgment."

This remark was challenged by one of my audience on the plea that the Company's staff is so hampered and hemmed in by instructions that there remains no room for the exercise of initiative and originality.

Now, we all know that any discussion which follows a lecture or the reading of a paper is largely dominated by a note of unpreparedness, because it needs the skill of a practised debater always to be able readily to formulate points in a manner that will convey precisely, in a few words, what is in the speaker's mind. Making due allowance for this fact, I was, nevertheless, on this occasion, startled. The suggestion of this captive state; the suggestion of a vast body of men and women so shackled by hide-bound regulations that the play of their reasoning faculties is denied them was new to me, and I asked myself this question, Does my critic really mean what he says; does he desire to be taken literally?

At once, I may say, I did not do him the injustice of supposing he had spoken his full mind; at the same time, it seemed to me, there passed over the meeting a wave of acquiescence, indicating that, with more or less success, a general sentiment had been voiced. How far my supposition was true I could not, of course, judge, but it occurred to me that if it had any foundation at all, this idea of excessive legislation must extend far beyond the four walls of the

hall in which we had met, and I, then and there, determined to give the subject a little attention and to present the results in the paper which I had already undertaken to read to your Society.

Although I did not, as I have said, believe that the contention was intended to be taken literally, I was bound to give credit to a conviction, no doubt honest but, to my mind, somewhat ragged, that our management has seen fit to issue a mass of vexatious and unnecessary instructions, the effect of which has been not so much to benefit the work and regulate our duties as to retard the capabilities and quench the ambition of the individual.

But suppose we take, for a moment, an extreme view of my critic's statement. What does it mean? Shortly, this, that the staff of this Company has nothing to do but to obey instructions! Does anyone really believe that this is the melancholy doom of every entrant into the Company's service: that not only is he expected to keep within the four corners of those instructions, but is positively forbidden to overstep their boundary? If this is the position, I ask this question: How does it come about that we are here to-night? Is not the very existence of this multiplicity of telephone societies, encouraged and fostered as they are by the administration, direct evidence of a desire to promote free and healthy discussion and the useful interchange of ideas for mutual benefit and advancement? Again, do we not all know that an education committee has been formed and periodically meets to consider the merits of inventions and suggestions which the staff is invited to submit? There is no undue disregard to the claims of the individual here, I think.

"The staff has nothing to do but to obey instructions." By way of illustration and parallel we will carry the idea to a wider region, to the region of the laws of the land, and we will paraphrase it thus: the whole duty of a citizen is to observe the natural and, what I will call for want of a better word, the "civil" laws. And we must supplement this by adding, the State forbids him to do anything else! Imagine it. Every man's library limited to blue books, with a lawyer in every family to interpret them; every life bereft of its individual charms and graces, merely an item in a huge puzzle of hard, dry facts.

I am not, of course, competent to give you a treatise on law, but I propose in a general way to draw your attention to a few points in connection with laws as introductory aids to my main subject, which is, the laws or instructions under which we serve the Company and the public.

You will have noticed that I referred just now to the natural law and the civil law. Briefly, for our purpose, we may take the difference between the two to be this: the natural laws are laws common to all civilised nations, such as those set forth in the Decalogue; and civil laws are those of a particular State, supplementing the natural laws and defining the duties, the responsibilities, the restrictions, rights and privileges of the citizen. To make the distinction clearer, I will give you examples of each.

A natural law tells you that you must not steal. At the same time the term "natural laws" must not be confused here with the simple, crude laws of Nature, such as, for example, the survival of the fittest, a law essentially selfish. The morally-untutored instinct of the child and the savage impels them to lay hands on anything they want or think it necessary to possess; in their eyes *meum* and *hunc* have no meaning. They do not rise beyond acquisition by the exercise of the greater force or the superior strategy.

The need for a code of moral laws becomes apparent as soon as the community awakens to the necessity of the preservation of order and of promoting and sustaining the common weal, and with the growth of civilised communities the rules of right and wrong and of honesty and dishonesty spread until they became international and immutable, finally to be recognised as ordinary moral instincts under the generic term "natural laws."

To appropriate the property of another is therefore an offence against a natural law, nor does it matter what form the property takes. Be it the owner's purse or his pheasants or his good name; all should be alike safe from our predatory instincts, should we still unhappily possess them.

The civil law stands on a different footing, and, as an example, I will give you smuggling.

In itself there can be no offence in pushing a boat off from the shore and purchasing a keg or two of brandy from a passing ship,

\* Paper read before the Gloucester Telephone Society.



or in a man's bringing a few hundred cigars into this country for his own private consumption. Having paid for them, they are his, and no natural law is broken. But the State steps in here, having a duty to perform—and a duty to impose. It requires revenue for the upkeep of the country, and it has selected these particular articles as a means of getting it. Therefore it makes a law of its own by which the importation of cigars and brandy becomes an offence unless a toll is paid upon them. And it creates an army of coastguardsmen and Customs officers to protect its interests.

Further, it is clear that under both the laws against theft and smuggling there is no question of discretion, no compromise, no palliation. No extenuating circumstances will excuse the smuggler, and the Customs officers have no authority to discriminate. For an example of the administration of law with discretion we must seek elsewhere.

The police have authority to take into custody those whom they observe begging; so that a man who, knowing you will not give him a night's lodging, asks you the price of it, is liable to arrest, the act stigmatising him a beggar. But the same police would hesitate before interfering with the well-dressed stranger who begs for money's worth in the shape of a light for his cigarette, or even for the cigarette itself.

Again, those who obstruct the thoroughfare also break a law, but instead of being called upon to pay the penalty, they are mercifully persuaded merely to move on. And you will readily perceive that unless a wise discretion were exercised, the machinery of the law would speedily and perpetually be clogged by the investigation of relatively unimportant detail. Broadly, what it amounts to is this: order must be kept and the public preserved from importunity and discomfort, and full powers are provided for the purpose.

We will now apply this sketch to some of our own conditions as members of a body which is subject, in addition to the ordinary laws of citizenship, to rules and regulations which the administration of every great business concern is bound to lay down for the guidance and welfare of its staff and its work.

It is totally unnecessary for the Company to issue a bald instruction that theft is prohibited; and yet to safeguard its interests it has to lay down certain rules which, by implication, recognise the possibility of this law being broken. For example, therefore, it is provided that the man who actually handles cash must not keep, or have access to, particular books, and *vice versa*. But, irrespective of any question of fraud or the manipulation of accounts, what a very simple and natural division of labour this is! The one man is responsible only for the receipt or payment of money and its lodgment in the bank. He is concerned neither in its collection nor its allocation; nothing but the care of it, and this is of sufficient importance to occupy his undivided attention. The rules which environ him place him practically above suspicion, and his position of trust is made easier by the fact that where money is concerned no question of discretion can be admitted.

His colleague in charge of the books has quite a different duty to perform. Clear rules are laid down as to the method of collecting accounts, but some tact and some judgment are necessary in their application. The undue worrying of a substantial firm which has a settled pay-day is as senseless as a highwayman pistolling a traveller who is prepared to deliver his purse without such persuasion; while on the other hand the ordinary procedure may prove too lenient in dealing with dubious debtors. At the same time, this discretionary discrimination must be wielded wisely and only by those who have gained their knowledge by practice.

We have seen that theft is an offence both against the natural and the civil laws, but there is a form of theft of which the State takes no cognisance and which, so far as we are concerned, the Company deals with entirely and lays down its own rules. I refer to the theft of time, and here, the instructions that provide for the hours of attendance are adamant; they admit of no compromise; they are ever part of the bargain between employer and employed, and in that sense they partake more of the nature of a compact than a law. In fact, like many rules, punctuality becomes a mere matter of habit and no more irksome than the orderly step of a regiment of soldiers on the march. And yet the rule of punctuality is one of the most important and necessary conditions of all service.

It will not be out of place here to note the distinction between a compact and a rule. And first, it is always the superior who makes a compact with the dependent, and in our case the compact is made at the time we enter the service of the Company. It is only after our initiation that we become bound by rules; until that takes place we are entitled to accept or reject, to say "I will" or "I will not"; but having agreed to the compact, we are subject to the "thou shalt" or "thou shalt not." That is to say, that although natural wills and inclinations differ, the consent to submit such wills to the governing body is a necessary preliminary to membership, and the acknowledged, governing will then becomes our law. It is the duty of the whole to protect its parts and, on the other side, each part must pay obedience to the will of the whole.

Under civil laws the reward for observance lies only in the enjoyment of our rights and privileges; in the Company's service the reward lies in advancement and the means of living. Howbeit, the simple fact remains that laws and rules can only persuade, they cannot compel; there is only one thing that is absolutely compulsive, and that is—punishment.

The rules of punctuality, diligence and so forth, which, defined or not, are recognised as part of our compact with the Company affect the staff generally. We will now turn to a set of instructions, from which no deviation is permissible but which directly concerns and dominates the work of one department only, viz., the Company's tariff rates and the Contract Department.

No doubt, a contract officer can say with some truth that his labours are hampered and his success impeded by the inelasticity of these tariff rates: that he, in fact, loses, by reason of his limitations, orders which might, in his view, be intensely profitable, and that were he endowed with some discretionary powers, had he a more free hand in negotiations, choice of localities, etc., the Company would very soon hear of something to its advantage, not to mention his own. And he honestly thinks he is taking a broad, reasonable view of the situation.

But I venture to think he is not. His view is probably bounded by his own centre or by an isolated case in that centre, and it may be that the particular order involved, taken by itself, would be a highly remunerative one to the Company. Either, he thinks that his instructions lack wisdom, or he overlooks the fact that laws are not made for the individual or to meet solitary cases. If his were the only centre or were he the only contract officer to consider, there would be no need for definite, detailed instructions. With, perhaps, the proviso that everyone must be treated equitably, all that would be required of him would be that the business as a whole must yield a certain profit on the outlay, and I venture to add incidentally that he would find his task by no means a bed of roses. But the position would be a matter of compact between employer and employed, rather than one of law.

A man looking closely at a brick wall may see a spider; another man standing farther off may detect several, and this is the position of those who are responsible for and draw up our service instructions. And contract officers and others who sometimes feel the pinch of a particular regulation may generally be sure of this, that its importance to the business as a whole is proportionate to the extent to which it seems harassing or unreasonable under peculiar conditions. In other words, its non-observance, though harmless in isolated cases, would, if general, prove disastrous to the Company's well-being.

But (still keeping to the Contract Department) to say that no discretion or initiative are left to its officers would be not only absurd but untrue. If it were otherwise, what would constitute the merits of a contract officer and wherein would lie the difference between a good and a bad one? The management can train and counsel, but it cannot distribute talents as it can instructions. By its rules and under their guidance each man has a fair and equal start, and the Company says, "within those rules use your talents, practise your discretion, employ your initiative, by virtue of which you may vary and create methods of persuasion, the fruit of which in your particular sphere is success, and according to your success so you shall be rewarded."

(To be concluded.)



## THE NATIONAL TELEPHONE COMPANY'S HALF-YEARLY MEETING.

At the 45th ordinary general meeting of the Company, held on Feb. 24, Mr. George Franklin, the President, in proposing the resolution adopting the report and accounts, said:

Shareholders will observe that whether for the half-year, or for the complete year, ending Dec. 31, 1909, the accounts continue to show steady progress, with increasing revenue and larger balances for disposal. The first item we come to is income accrued in respect of the business of the half-year, which has increased from £1,498,431 to £1,599,970, an increase in our revenue for the half-year of £101,539.

The first deduction is Post Office royalty, £153,857, as compared with £144,226, an increase on the half-year of £9,631, and making a grand total of royalty paid to the Postmaster-General, for which no services whatever have been rendered to the Company, of something like £3,100,000 from the granting of the licenses to date.

Taking next the working expenses, you find that they have increased from £858,566 to £922,693, an increase of £64,127. This leaves us with a net result of £523,440, as compared with £495,638, a balance of £27,802 more than we had this time last year. This increased amount has been disposed of by debenture and other interest, which, as shown in the accounts, have absorbed £13,545 more, the allocation to the reserve fund of £170,000, whereas for the corresponding half-year it was only £155,000, an increase of £15,000, and the rectifications between the increased balances brought forward and carried forward account for the difference. On revenue account No. 2 for the half-year we shall there see what these expenses are. Rents of premises, taxes and insurances £122,566, as compared with £111,049 for the corresponding half-year, an increase of £11,517; administration and management £376,618, as compared with £365,587, an increase of £11,031, and maintenance and renewal of lines and instruments and depreciation allowances £338,606, as compared with £322,075, which shows that on the maintenance of our plant there is an increase of expenditure during the half-year of £16,531. The other item in revenue account No. 2 shows rent and maintenance of Post Office wires £51,253, as compared with the rent and maintenance of Post Office wires in the corresponding half-year £31,118, whilst other increases in income tax, pension fund and Parliamentary expenses make up the figure of the increase for the half-year of £64,127.

On the whole year 1909 there is an increased income of £198,126, being the difference between £3,149,126 in 1909 and £2,951,000 in the year 1908. There is an increase in Post Office royalties of £19,226; an increase in working expenses of £125,956, and an increase in the net result, and that, after all, is the thing in which shareholders are most keenly interested, of £52,944. This £52,944 has been absorbed by extra outlay for debenture and other interest, £26,500, an additional sum carried to reserve of £25,000, and an additional sum carried forward of £1,344, less £100 in the amount brought forward.

If we now turn to the capital account we shall find that during the six months there has been expended on construction of exchange and private stations £255,361, as compared with £361,079 in the corresponding period of the previous year. The diminution in amount is entirely due to the necessary restriction which has had to be placed upon capital expenditure owing to the approaching termination of the license.

We see that there has been expended on the purchase of undertakings and the construction of the system £14,972,793. That is equal to £29 14s. 7d. per station. Whilst I should not dare to presume to institute comparisons between the Company's system and any other, yet there is no harm, I think, in saying that the system which has been constructed by the Post Office in London and the provinces has cost the Postmaster-General—I was going to say twice that sum—but almost twice that sum. I believe his average cost works out at something like £52 per station. I do not know whether we are to deduce from that that the Postmaster-General's plant is very much more up to date than the Company's plant; but, as I said just now, comparisons are odious, and I do not want to institute any comparison. But as I am speaking of our capital cost per station—and you must remember our capital cost is stated to be watered and inflated and everything else, at least we have been told that, although people are getting a little wiser now—I think that at all events it is right that the shareholder should know that his capital stands in the books at a sum between £29 and £30 per station, and that the Post Office capital for telephone stations stands in the country's books at a sum of over £50 per station.

If to the capital expenditure we add the land and buildings £850,197, we have a total of £15,822,990 expended upon this business, and it may be of interest to the shareholders to know that of that 15½ millions there has been expended during the past six years sums approximating to £6,000,000 sterling, which go to show that with this expansion of the Company's plant we have met during the past few years the requirements of the public so far as telephones are concerned. On the other side of the account we find there has been raised in shares and stocks, including debenture stock, £11,483,593, leaving us with a balance being in excess of expenditure over capital raised of £4,339,397, which you will find brought down as the first item on the credit side of the balance sheet.

In the Directors' report it is stated that a certain sum has been expended on capital account during the half-year in the erection of 13,896 additional exchange and private stations, of which 13,443 are upon the measured rate or system of payment according to user, making a total number of 503,643 stations. Whilst we are on this question of stations, it might be well to refer again to the question of the Post Office competition in London which, as you are aware, has been going on for some six or seven years. The number of the Company's exchange stations in London at Dec. 31, 1909, was 112,205, as compared with 103,287 at the corresponding period of 1908, showing an increase of 8,918 stations, whilst the Postmaster-General's system had only 60,091 stations as against 52,422, or

an increase of 7,669, so that the Company has increased its lead in London on the Post Office system by 1,249. I think that at all events shows that your system is growing rapidly; and the only competition between the Company and the Post Office is a competition in efficiency of service, as to which I will have a word to say by-and-by.

The unexecuted orders on Dec. 31 last represented 5,435 stations with an annual revenue of £36,229, as compared with 5,220 valued at £34,334 per annum at the corresponding period of 1908.

Now, these results, which I have endeavoured to indicate to you, satisfactory as they are, have not been achieved at the sacrifice of efficiency. I have already shown that the expenditure upon maintenance and renewal of lines and instruments has been increased by £16,531 for the half-year, whilst for the complete year the charge under this head has increased by £25,020. Perhaps, however, the best test applied by the subscribers and the public and the shareholders, too, is the quality of the service, and the Company have the strongest evidence that, alike in London and the provinces, there has been a marked improvement in the readiness and rapidity of communication, and this is borne out by the fact that in London during the past four years there has been a diminution in the complaints made to the Company of something like 40 per cent. in number, and that, I think, is satisfactory evidence, first, that we are spending upon maintenance considerably more than we have ever done before; and next, that the efficiency of our service is as good or better to-day than it has ever been at any previous period in the Company's history. Well, now that is the story with regard to the figures of the accounts, and I have no doubt they will strike the shareholders as they do the Board, that as figures and as a story they are a cause of great satisfaction.

There is no doubt whatever that the Company is making the best of its opportunities, having regard to the many difficulties with which it has been confronted; and if we may now turn from the study of the financial results of the Company's working, I should like to say a word or two on the Company's position in view of the approaching termination of its license.

At the last half-yearly meeting I referred to a statement made by the late Postmaster-General, to the effect that an earlier purchase of the Company's plant, properly, and assets than that provided by the purchase agreement of 1905 was, from the public point of view, advisable. Following upon that statement, certain discussions have taken place, having for their object the determination of the value of the Company's plant. I have to say that those discussions have not had any result. I do not believe that in the Company's interest it would have been possible to have proceeded upon the lines which were suggested with regard to this question of earlier purchase.

In the event of no arrangement being arrived at, the value of the Company's assets at the end of the license is, in case of difference, to be determined by arbitration. In this contingency it is necessary to provide a detailed inventory of the Company's plant, upon which to found its claim. The preparation of this inventory and claim—covering the plant and assets connected with nearly 1,600 exchanges, with more than half a million stations spread all over the United Kingdom of Great Britain and Ireland—is a gigantic task, and must impose a heavy burden upon the Company's officers. In view of the nature of this task, the Board and the staff have for some time past been engaged in the preparations necessary for this important work, with the object of enabling the Company to be in a position to prefer its claim at as early a date as possible after the termination of its license—a course which the interests alike of the shareholders and the public would appear to demand.

The arbitration authority arranged in the purchase agreement was, as you may remember, the Railway and Canal Commission, and by an act of Parliament, which received the Royal assent on Oct. 20 last, that body has been clothed with power to undertake the work which this agreement commits to them.

I can only say with regard to that, as well as to the policy of the Company generally—whether in managing its daily business, or in looking, as we are sometimes asked to do, to our latter end—we shall devote ourselves unstintingly, both in thought and labour, and spare no effort to see that the Company's claim—if that claim has to be made before the arbitration tribunal—is properly made, and that the interests of the shareholders of the National Telephone Company do not suffer.

Mr. FRANKLIN said, in conclusion: It has always been usual, I think, for the Board to ask that the resolution of confidence in them shall comprise the members of the staff of the Company. We have a staff of some 17,000 people, all of whom are animated with the excellent desire to do the very best they can for the Company. The Telephone business is a business which, as I have said before, fascinates all who touch it, and it is gratifying to know that we get from our staff services such as, I believe, no other Company similarly situated could be led to expect. We have at the head of our staff in the various departments men of single-minded purpose doing their best day in and day out, constantly thinking of the problems which are with us to-day, and which I suppose will now be with us to the end. I am sure it will be a satisfaction to you to know, as it is naturally for them to feel, that their services are appreciated by the shareholders of this Company.

### A SMART JUNIOR.

A JUNIOR of the clerical contract staff at Brighton has shown recently a business aptitude (and this too, after office hours) well worthy of commendation.

A certain London firm had been written to in connection with the telephone service for their new establishment about to be opened in Brighton, but unfortunately without result. The manageress of the firm came to Brighton, and put up for the night at the same residence as the aforesaid junior (who is fifteen years of age). The lad discovered that an opposition line was being arranged for, and he pleaded his, and the Company's case so fluently that the next morning the contract was secured for the Company's service.





EDITH E. FITZGIBBON.



BEATRICE CLIFFORD.



ALICE BESSIE SMITH.



ALICE CLARA PINNELL.



MAY TUCKER.

## TELEPHONE WOMEN, LXI—LXV.

## THE SUPERVISING STAFF, BRISTOL:

(LXI) ALICE BESSIE SMITH, (LXII) ALICE CLARA PINNELL, (LXIII) BEATRICE CLIFFORD, (LXIV) MAY TUCKER, AND (LXV) EDITH FITZGIBBON.

ALICE BESSIE SMITH, Senior Supervisor, entered the service of the Western Counties Telephone Company in July, 1888, as an operator. ALICE CLARA PINNELL entered the service a little later in the same year.

At that time the old slipper pattern peg boards were in use, and multiples were not known. At the Bristol Exchange there were about 500 lines and ten operators. These have now increased to 3,400 and 42 respectively, and the board has been changed first to the magneto call-and-clear system with multiple jacks, and then, in 1900, to common battery working, being removed at the same time to the new building of the National Telephone Company in Baldwin Street.

Both Miss Smith and Miss Pinnell were pupil teachers before entering the telephone service. These ladies make their work their hobby, and are looked up to and respected by all members of the staff.

BEATRICE CLIFFORD and MAY TUCKER entered the service in 1896, just prior to the handing over of the trunk lines to the Post Office. The Bristol Exchange then consisted of a magneto board with twelve operators and a clerk-in-charge, from which it has grown to its present dimensions. Misses Clifford and Tucker have seen many changes in the *personnel* of the Company, notably—two district managers, three local managers, two exchange managers, and two clerks-in-charge.

These two ladies also take very great interest in their duties, which is really a characteristic of all the supervising staff at Bristol.

EDITH E. FITZGIBBON, who has recently been appointed Travelling Supervisor for the Bristol district, seems to have found the right scope for her energies. Entering the service of the Company in 1897, she too has been through many changes both of equipment and staff. A natural enthusiast, she imparts her enthusiasm to others, and her various visits to the exchanges are looked forward to keenly by the staff. Comment on her work is needless here, except to say that Miss Fitz-Gibbon has quickly solved the great problem of rousing and maintaining the interest of the sub-exchanges operating staff, thus making her task of organising much lighter than it would otherwise be.

In the Bristol district, at any rate, there is no need for questioning the success of the installation of the travelling supervisor.

## ALD. FRANKLIN, Litt.D.

## PRESENTATION OF PORTRAIT.

THE long record of public service that Alderman George Franklin, Litt.D., has rendered to his native city, says the *Sheffield Daily Telegraph*, was celebrated at the Sheffield Town Hall yesterday, when a large and representative gathering of his fellow-citizens met to do honour to his distinguished career.

On behalf of a numerous body of subscribers, the Lord Mayor (Earl Fitzwilliam) presented Alderman Franklin with his portrait, which was unveiled by the Lady Mayoress (Countess Fitzwilliam), whilst Alderman Stephenson also handed to Mrs. Franklin a magnificent single-stone diamond pendant, in recognition of the help she has given her husband in his public work and the philanthropic labours in which she has engaged.

The portrait, which is a fine work of art, is the work of Mr. W. W. Oules, R.A., an artist of eminence. It will hang permanently in the Town Hall, but a replica will remain in Alderman Franklin's possession. The idea of putting on permanent memorial Alderman Franklin's great work for the city was originated during the Lord Mayoralty of Alderman Styrring, and is in natural succession to the similar honour that was paid to Sir William Clegg.

The subscription list amounted to between £1,300 and £1,400.

## THE NATIONAL TELEPHONE MUTUAL BENEVOLENT SOCIETY, WEST KENT DISTRICT.

THE accounts of the above society, which was formed in April, 1909, have been made up to Nov. 25, the result being highly gratifying to the members, who now number 102.

The amount paid in averaged 7s. 6d. per member, and after relieving four cases, amounting to £6 10s. 10d., each member received an average of 6s. for his or her share, leaving a balance in hand of £4 15s. 10d.

## GLOUCESTER DISTRICT MUTUAL BENEVOLENT SOCIETY.

A GENERAL meeting of the above society was held on Dec. 29 when the hon. secretary, S. G. Hare, read the annual report and balance sheet for the year 1909. The total membership for the district from Cheltenham, Evesham, Gloucester, Hereford, Stroud and Lydney centres numbered 78.

The receipts for the year ending Dec. 25 amounted to £47 9s. 3½d., and the expenditure was as follows:—Sick pay, £18 4s. 6d.; refunded to members leaving the Company's service or transferred, £1 11s. 4d.; cheque book, 2s. 6d.; postage, 3d.; total £19 18s. 7½d.; balance £27 10s. 8½d. From this amount £27 9s. 9d. was distributed amongst the various members in respect of annual dividend, the balance of 11½d. being carried forward to the year 1910.

The balance sheet having been read and generally approved, expressions of appreciation at the financial result, with a vote of thanks to the hon. secretary, S. G. Hare; hon. treasurer, H. Millett; and hon. auditors, T. H. Thompson and R. J. White, for their respective services were passed.

The election of officers and committee for 1910 are as follows:—Mr. R. A. Dalzell, Provincial Superintendent, president; Mr. C. Elliott, vice-president; Mr. S. G. Hare, hon. secretary; Mr. H. Millett, hon. treasurer; Mr. H. Thompson and Mr. R. J. White, hon. auditors. Committee: Messrs. W. J. Norman, J. L. de Medewe, F. W. Secats, J. Savory, C. M. French, W. A. Taylor and Miss Harry.



J. A. McLennan, F. Burroughes, H. G. Peck, E. W. Atkinson, F. J. Saunders, G. H. Bryant, W. Hills,  
 T. M. Inman, R. H. Carter, J. Johnson, F. M. Ward, A. E. Abbott, L. Bignell, J. H. Paterson, J. H. Stewart, J. McLeish,  
 E. C. Humphrey, J. R. Angier, A. R. Macfarlane, G. F. Gadsby, J. B. Ryall, F. Woodard, G. A. Payton, T. H. Edgerton, H. Sadler,



E. M. Hall, P. J. Ridd, J. Rolton, P. T. Wood, G. F. Greenham, A. Wright, A. C. Greening, A. Warner,  
 W. Blight, R. H. Drury.

## LONDON AND ITS ORGANISATION.

### ELECTRICAL.

By J. STIRLING, *Metropolitan Chief Accountant*, and G. F. GREENHAM, *Metropolitan Electrician*.

AMONGST much that lies to their credit, Telephone Societies have also this—that they have reduced to a commonplace the comparison between our primitive telephone appliances of 30 years ago and the latest product of the electrician's ingenuity and skill. It is a far cry from peg boards and Blake transmitters to central batteries and "solid backs"; yet it has all been accomplished within the short space of a quarter of a century. One wonders whether the next generation will have to face a similar revolution, and contemplate

with mixed feelings the scrapping of that plant which we to-day regard with so much pride.

"Electrical" Department, although a convenient description, is to some extent a misnomer. It is at once too comprehensive, and not sufficiently expressive. Every branch of the telephone business is, or ought to be electrical in a very wide sense—in knowledge and in action alike. "Internal Engineering" is in some ways better, but lacks the euphony and general acceptance of the other. After all, nomenclature is not of primary importance, and so long as the prescribed functions are adequately discharged we need not waste time on mere names.

The fitting of all internal apparatus, and the care of it after completion, is in London neither a simple nor a light task. What it lacks in ease it makes up for in attractiveness, and generates that love of one's work which amply compensates for anxiety and toil. Just a few figures to illustrate the gigantic system with which the



Metropolitan Electrician and his staff have to deal, and over which they must exercise a control so complete that inconvenience to the public will be reduced to a minimum, and unavoidable troubles cleared with the utmost promptitude.

Exchanges over 1,000 lines ...	=	17
„ under „ „ „ ...	=	44
Subscribers' lines on exchanges ...	=	70,000
Instruments at Subscribers' premises ...	=	122,000
Lines connected to Switchboards, Fire Bells, etc. ...	=	30,000
Switchboards at Subscribers' offices ...	=	8,700
Junction Wires between Exchanges ...	=	6,400

Figures are, as a rule, dry, but anyone with a little knowledge, and even a slight touch of that imaginative faculty which is none too common, can conjure up from those quoted an interesting picture of the complete and extensive organisation required to cope with the work of which these figures give but a feeble indication. Numbers, indeed, form but one factor; distance, locality, type of apparatus are others both insistent and important. In one neighbourhood a man may have to travel some miles to clear a fault or inspect an instrument; in another, one block of buildings may keep an inspector occupied for days. In one locality the bicycle is the

definitions that the right men are at the head. Experience justifies the assumption. The group reproduced at the head of this article is composed of the senior Metropolitan Maintenance and Fitting officers.

The appended Staff Diagram (Fig. 1) shows more graphically than much description how the work is distributed and supervised. The Metropolitan Electrician, with his Assistant, and the two heads of the Maintenance and Construction branches respectively, are stationed at Salisbury House. To them come reports from the Divisional officers on matters affecting their districts. From the central office are issued, as the need arises, numbered circular letters, containing instructions on the multitudinous points which must present themselves for attention in a large business. Diagrams of the numerous circuits now necessary in telephone work are also sent out, marked with consecutive numbers for easy reference. In addition, a monthly conference of Divisional Officers is held, and at these meetings important questions affecting the smooth working of the Company's business are constantly discussed and settled; many valuable suggestions have been made at these gatherings, with resultant gain to the Company.

For Maintenance work there are six Divisions—four on the

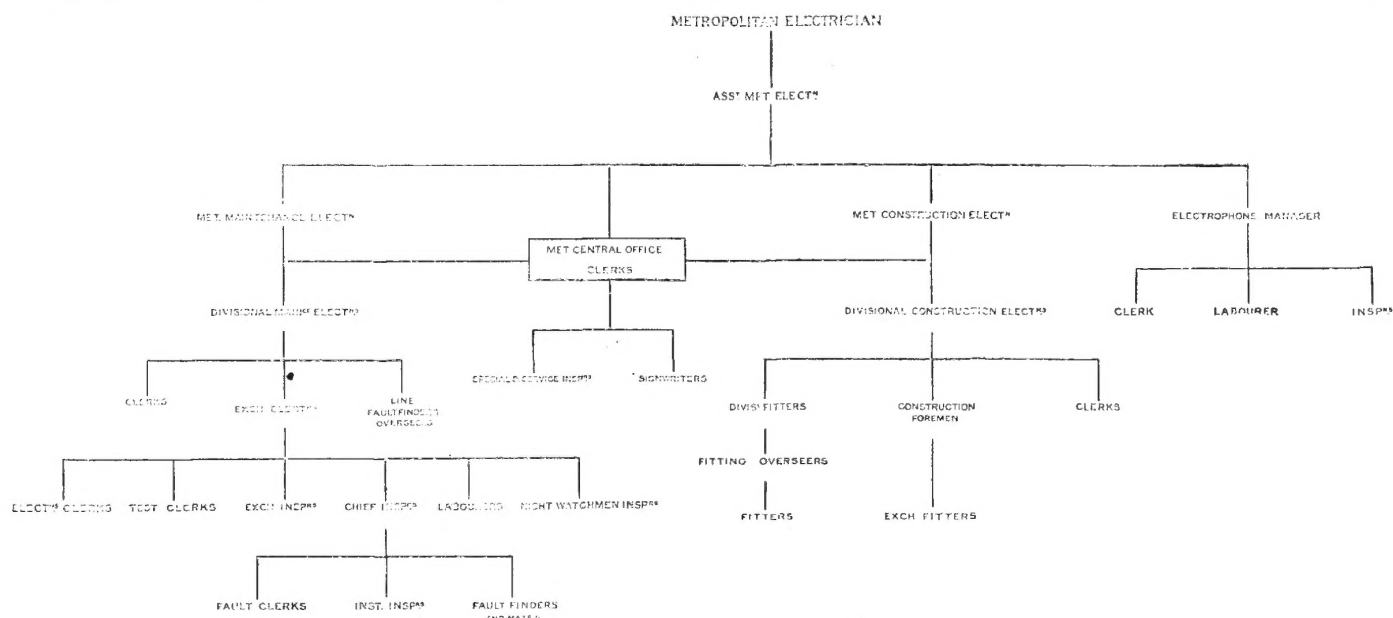


FIG. 1.

quickest mode of conveyance, as the Company do not yet supply motor cars; in others the motor bus, the tram, or the tube speed the workman to his destination in a few minutes. Whether magneto or common battery instruments; whether there are switchboards, switches, indicators, bells, or other apparatus; whether the neighbourhood is densely or sparsely telephoned: these are all points which have to be carefully weighed and appraised if the best and most economical work is to be obtained from the Maintenance staff.

Somewhat similar problems have to be solved in fitting work, although obviously the extent is not so great, owing to the limited number of jobs which can be allotted to each man per day. It is only a question of degree, however, and the Fitting staff have the extra difficulty that they do not know what they are to encounter in the way of "soft" walls, expensive paper which must not be finger-marked, eleventh-hour additions or alterations required by the subscriber, and a host of other impediments which are doubtless familiar to all who have to deal with works orders.

Successful administration is largely the result of effective central control and systematic distribution of duties. The personality of the men in charge is naturally most important, but as even the best system will break down if ineptitude and incapacity characterise those operating it, one takes it for granted in all

north side of the river and two on the south. The most important is the City, with its huge intricate congeries of streets and lanes, its immense office blocks, each with scores of telephone instruments, its towering warehouses, its Stock Exchange, its Markets, its Tubes, its never-ceasing traffic, its continuous buying and selling—all of which exercise an important influence on telephone needs. In one City exchange the average outgoing calling rate is slightly over twenty per line per day; naturally instruments used to the extent that figure represents, and an exchange through which so great a traffic is passing, require considerably more attention from the Maintenance staff than those located in less bustling districts. The increase of recent years in extension instruments, and their necessary accompaniment of switchboards, in City offices, has complicated still more the work of the inspectors, and made an extra draft on their intelligence and skill.

Next in importance is the Western Division, with headquarters at Gerrard Street. Shopping centres, hotels, the fashionable residential districts, Parliamentary offices—all are here. It is Society's happy hunting-ground, the seat of senatorial wisdom, and the resort at all times of that cosmopolitan crowd which is never absent from London—not even in the height of summer, when "there is nobody in town." The growth of the private branch exchange system in the hotels and large stores has been the outstanding feature in the



West End; to our electrical staff it has brought many new problems, and much additional work.

The North-West Division is controlled from Paddington, and the North-East from East exchange premises. The former includes the great railway termini of the North, the latter covers a large area comprising such diverse elements as the Docks, the East End factories, the vast playground of Epping Forest, and the suburban quietude of Finchley, Barnet and Enfield.

Of the two Divisional Officers on the Surrey side of the Thames, one is stationed at Hop, and the other at Sydenham. The one takes all the Borough, Blackheath, Battersea, Streatham, Wimbledon, Richmond and Woolwich neighbourhoods, partly business, partly residential—one part decaying or decayed, and another part just blossomed from “eligible sites” into the staid respectability which accompanies streets of desirable suburban villas. The other officer presides over a glorious country where business is little known. It is a land which has been captured by the man of leisure, the City gentleman who need only spend an hour or two occasionally at his office, and to some extent the man who tempers business by day with the fancy that he likes to do gardening at night. Golf and tennis are its recreations, telephones its luxuries. Bye-and-bye the latter will become its necessities, when the dwellers within its bounds realise how much their pleasures and ease may be ministered to thereby.



FIG. 2.—EXCHANGE ELECTRICIAN'S OFFICE, GERRARD.

This somewhat discursive description of the London telephone territory is given in the hope of emphasising the varied and complex needs that have to be catered for, and the difficulty of setting up a standard of efficiency or of cost which would be applicable in every portion of the area.

Next in seniority to the Divisional Officers are the Exchange Electricians. They number fourteen, and under their control work the staff of Exchange and Instrument inspectors, test clerks, fault clerks and faultfinders, totalling 450. The Exchange Electricians are responsible for the condition of all exchange and subscribers' apparatus within their respective areas, and for the exercise of an effective supervision over the work of the maintenance staff. They have likewise to act as peacemakers with subscribers suffering from exceptional troubles, see that the monthly estimates of expenditure are adhered to, know the weak spots and the special features of all plant, and generally see that their staff walk in the right path.

Up to the end of last year a special department received all complaints, passed them on to the electrical staff for attention, and afterwards communicated with the subscriber, if necessary. Recent efforts to educate subscribers into reporting troubles by telephone to the Clerk-in-Charge instead of by letter, combined with a steady improvement in the plant and service, have resulted in the Complaint Office being abolished. Letters arriving at the Metropolitan

Offices are immediately telephoned by the Correspondence Department to the Test Clerk, who makes out a docket, the number of which is entered on the letter by the telephoning clerk. The letter is then filed. Special complaints are, of course, referred to a senior maintenance officer. Instrument faults per maintained station for the past twelve months were only '95, a figure which surely spells efficiency.

The docket and testing arrangements have not many special features. One worthy of mention is that the Exchange Testing operator and the test clerk keep in front of them a sheet of paper ruled off into squares, each square representing a block of subscribers' numbers. The number of each subscriber for whom a docket has been passed on to another officer is entered in the appropriate square; by this means the course of any docket can be traced, and subsequent enquiries rapidly dealt with. The sheets are also useful for keeping a watch on repeat fault forms.

Instrument Inspectors have very important and often trying duties. A subscriber whose instrument is faulty is generally pleased to see them, but frequently his pleasure is expressed in the form of reprimand and expletives rather than delight; in other words, his sense of annoyance over the temporary breakdown of his telephone overcomes his feeling of pleasure at the prospect of prompt restoration. One day, perhaps, human nature may be so idealised that the average telephone subscriber will rather think with gratitude of the thousand occasions when his telephone has worked well, than with revilings over the occasional incident of its being out of order.

With the advent of central battery instruments the inspector's routine duties have become less exacting, but that gain has been largely counterbalanced by the increase in the number of subscribers' switchboards. The allocation of all duties and rounds, and immediate supervision of internal fault-clearing and inspecting, are in the hands of Chief Inspectors, of whom there are eleven. To them the men appeal in cases of difficulty, and through them report any matter affecting the Company's interests. Faults are, of course, given out by, and the “clear” given through to, the fault clerk by telephone in the recognised manner.

The instrument staff meet with all sorts of curious experiences. That is not peculiar to London, but one or two of the incidents which have added variety, if not a “crowded hour of glorious life,” to the ordinary day's work of some of the London staff are not without interest. It is difficult to enter into the mingled feelings of uneasiness and chagrin experienced by the inspector who, after clearing a fault, found his exit barred by a large dog, which threatened attack at each attempt to leave; ultimately the telephone was utilised to summon the next-door neighbour, and so secure release.

The reply of a subscriber to an enquiry as to which receiver was broken—“Well, it's not the receiver you listen with, but the one you put to your ear to stop the noise from coming through”—was a model of limited knowledge lucidly expressed.

At a naturalist's in East London an inspector was startled to find at the end of an examination of the instrument protector that all his operations had been carefully watched by a large chimpanzee. Two hours later the man, on passing the premises, was dragged in by the proprietor, and told that the telephone was out of order. It was found that the monkey had taken the protector cover off, removed the fuses and heat coils, and deposited the treasure trove in his bed of straw.

Queer places and curious faults abound. One of the former where a fault had to be cleared was the post-mortem room of the London Hospital. We sympathise with the inspector's description of his experience as “gruesome and unpleasant.” Of the latter, an aged survivor of earth-circuit times was reported for intermittent refusal to work. After much tribulation, it was found that when the tide was low the earth-plate which was sunk in the river bed got quite dry, hence the stoppage. It would appear that a healthy thirst can be developed in the scientific as well as in the human world; but temperance reformers will gladly learn that the element used to quench it was harmless.

Call Offices are an unfailing source of curious and amusing incidents, tempting one to exclaim with Puck, “Lord, what fools these mortals be.” We rather pride ourselves on the extent to which the telephone is becoming used and known by the public.



To watch a group of country cousins gazing open-mouthed at someone using the telephone at a busy station, or to listen to a few of the ingenuous and original explanations of the spectacle which they offer to each other, rather shatters our pride, even if it does also impart a comfortable feeling of superiority. Yet the user is often little better than the gazer at a public Call Office, as witness the callers (ladies, as a rule) who will insist on trying to speak into the earpiece, and get the mouthpiece to the ear; one lady was quite indignant when the inspector offered to show her how to use the instrument.

The introduction of common battery instruments will abolish the last-mentioned vagary, but we may safely take odds that others will come along. Indeed, one has arrived, for a visiting inspector found the source of a gurgling noise proceeding from inside a call-box to be a burly farmer-looking gentleman engaged in the healthy occupation of blowing vigorously into the transmitter mouthpiece, evidently under the impression that the thing worked like a speaking-tube. Being a mere man, he welcomed the proffered tuition, and departed beaming, whether at the completed message or the joke we did not learn—probably he did not see the latter.

One curious call office fault was discovered by observation at the hour when the intermittent trouble usually came on. The occupant of the box was big and broad; the box was somewhat narrow for his liberal proportions. Result 1—as he swung his arms slightly round in the effort to drop his penny into the slot, his elbow pressed down the hook of the Ericsson instrument. Result 2—no buzz, no call, lost twopence, lost temper. Result 3—language, of which the less said the better.

(To be concluded.)

### OPERATING AS A CAREER.\*

By FLORENCE J. MINTER, *Metropolitan Examining Matron.*

As in choosing a career for girls the careful parent considers many professions and trades, I think it is as well for us to wander from the well-trodden path of the telephone world and glance outside into that greater world of workers, as applied to the eternal feminine, which we are apt sometimes to forget.

We move so rapidly nowadays that we seldom have time to realise what tremendous changes have taken place in the general conditions of life since the days of our grandmothers, and especially in connection with woman's place in the universe. (Not being a suffragist, I am not making this an opportunity of showing what we still lack in a vote.)

The fact remains that 50 years ago a woman who ventured to business, or dared to be something other than a somewhat meek and domesticated dependent, was looked upon with suspicion; but she evolved into a business girl, who became tolerated as she became more general, and has, in spite of still a few objectors, become a recognised necessity. Periodically we are reminded of woman's proper place, and pathetic pictures are drawn of the home duties she neglects; she has even been quoted as ousting men from their positions, and thus swelling the ranks of the unemployed. No one has a higher ideal of happy home life for women than myself—personally I deplore the necessity which brings women in competition with men for their existence—but I recognise that with no superabundance of unselfish brothers to support the unmarried sisters of their families women must work, must put their shoulders to the wheel, must make their own careers, and, as a sequence, it has become difficult to find one sphere of labour in which woman has not planted her foot, and that firmly.

But there is a dark side to the picture. Although, with the increase of the sex and demand for work, Father Time has opened up fresh fields for labour, especially during the last eighteen or twenty years, my experience shows me how lives of toil and discomfort are being lived for a mere pittance, and also that the competition of numbers, and not always the "survival of the fittest" leaves thousands to undertake hopelessly underpaid positions in unhealthy surroundings and generally poor conditions.

Possibly a few figures in connection with two of London's biggest commercial training schools will enable you better to compute the number of girls annually seeking careers.

The number passing through Clark's Commercial Training College alone is annually 3,000. Many clever, well-educated girls who do not care to face the growing severity of the Civil Service examinations take up commercial pursuits, and average about 1,500 students. For these from 1,000 to 1,200 positions are annually found. There have actually been over 20,000 successful students passing through this training centre alone.

Pitman's Metropolitan School, to which first place must be given in the shorthand world, has at its disposal more than 2,000 appointments a year for shorthand typists, and also trains many students for professional, preliminary and Civil Service examinations.

Compare these figures with those of ten years ago; then go back another ten, and see how positions for women in business have steadily increased.

To refer again to typists. At all polytechnics typewriting is taught, and at various London offices of machine-making firms free tuition is given. The number of girls actually training for this work alone is computed to have risen 150 per cent in five years.

Beyond this, the London County Council Schools make a feature of training girls in shorthand, typewriting, and other commercial pursuits, and the demand in the Evening Continuation Schools has grown to a tremendous extent. In these schools any female, irrespective of age or social position, may now acquire a knowledge of typewriting for 1s. providing she has attained a certain speed in shorthand. They are supposed to become experts, but I do not think this is possible under the conditions, although they certainly are enabled to obtain, if not efficiency, the knowledge of shorthand or typewriting, which is the key that opens the door to many clerical appointments.

A fact which I think is so often not appreciated by our learners is the cost to the Company of training them. It has been found in London that the average cost to the Company for the school tuition, based on a large number of cases, is £6, but this does not include the additional cost incurred in making an operator proficient at an exchange.

In most trades an apprenticeship must be served, which often represents at least two years' service given, or a premium paid, and the eventual salaries earned do not always justify the outlay.

Some people have very erroneous and strange ideas with regard to the work. One mother wrote me: "I have been told that the telephone work is most injurious to the nervous system—that it is so much so that the operators have to wear bands round their heads. I want you, please, to let me know if this is so, and if it is true that doctors are putting telephone work down for women."

In spite of this sort of thing, however, we still receive in London some thousands of applications in the year.

I have already dealt with the present-day dining arrangements in an article in the first number of our JOURNAL, so far as they apply to the catering committee, so that it is unnecessary to dwell at any length now upon the subject. I would, however, point out by way of comparison that we are now providing in London lunches at 21 exchanges, and have a kitchen staff of 58, whose salaries amount to over £1,400 per annum, and who deal with an average of 8,500 lunches and teas per week.

The only exchanges at which such arrangements do not exist are those with less than twelve operators, and even these, where possible, are at least having separate tea rooms provided for their use.

I understand the first co-operative cooking was at Liverpool.

In these same days there were no training schools for operators, and the newcomers had to pick up their knowledge of rule and manipulation as best they could, and very difficult they must have found it. Now, of course, everything is so organised as to make an operator's work as easy, and her telephone life as happy and comfortable as possible, and from the time of her application to the time she is turned out of the school to an exchange as operator on probation a recognised routine is followed. I have often thought it would be possible to write an article on "Why they fail," and in dealing with the prospective operator I will now touch on some of the reasons which account for the many disappointments we cause

\* Abridged and revised from a paper read before the Birmingham Operators' Telephone Society, session 1908-9.



in the rejection of those who, in their own mind, have decided upon operating as a career.

Of course hundreds of letters received are so hopelessly illiterate that the number rejected for this alone is very high. Some of these are really too amusing to lose sight of, and I subjoin a few unique specimens.

Sir,—Having read in the paper that you are in want of Ladies for the London Telephone I should very much like to do it if it is to sleep in.—Your Truly, SARAH V.

Sir,—Seeing your advertisement in the "Daily Telegraph," I should very much like to give you a trial as a learner.—Your Truly, KATE Q.

Sir,—I answer your advert. in the "Daily Telegraph" for young girls to learn the telephone. My height is 5 ft. 5 ins., and age 18 years. I should be very pleased to hear from you or I could call and see any time after 6.30 of a even or any time on Saturdays.—I remain, yours Truly, Miss R. R.

If I have been accused of having too high an educational standard for our girls, I think I was justified in sending the writers of these letters the "cannot further entertain" form. Speaking of these particular forms, I might mention that they are often not accepted by the recipients at their full value, and second and third applications are made by the same people, who tell us in their letters that they applied before, but we told them "there were no vacancies." The parents of some of the rejected are not always easily appeased, and recently a letter was received from the father of a girl who, on applying, said she thought herself quite suitable for the post, but she unfortunately sent a badly spelt letter on a half sheet of paper. He said: "I think it ridiculous to advertise for people, and then to sent answers without knowing or ever to take any trouble to find out if they are suitable or not. I am keeping this letter to sent to the head one of this business, as it is a Limited Co. I will find out the reason why applicants are treated in this of-hand business."

Occasionally, however, it is the Company or their terms that are rejected, and one man must have heard something terrible of me, for an appointment having been made with his daughter, she wrote: "Regret to say I cannot call on you, as Dada objects"!

When we reach the forms, too many are rejected from the obvious want of education in the applicant, and many careless, often amusing, errors are made. One girl applying last year gave the date of her birth as 1909; the date given in another case made the age as over 100.

One gave her height as 7 feet 6 inches, and another stated her father's occupation to be "diseased."

One girl stated the only certificate she had received was "for cruelty to animals," and on my asking her of what the particular cruelty consisted, replied, "writing an essay."

It is, of course, obviously impossible to go into details, either with the applicants or their parents, of the many reasons for not accepting them. Some have only to come inside the door for their unsuitability to at once be apparent, and with from fifteen to twenty girls to see in an afternoon, one often longs to be able to say "No," and dismiss them summarily.

There are so many small things which, if one be a character reader at all, are quickly noticeable; others are difficult indeed to gauge. Much information withheld through ignorance, and often wilfully, can be obtained by judicious questioning.

With regard to the general selection of candidates, I dealt with one year's figures in the JOURNAL some time ago, and I will therefore touch but lightly on the subject. The chief points for consideration are:

Appearance.

Voice and articulation.

Manner or tone.

Intelligence (and with that I couple the most valuable asset of anyone)—

Common sense.

Age is determined, as a rule, before the candidate reaches an interview, and height should be, but unfortunately since the advertisement and the form give the required minimum of 5 feet 3 inches, 75 per cent. of the applicants give their height as that, and we have long since found the usefulness of a proper apparatus for measuring the questionable candidates in this respect. The unbelieving way in which a number of girls glare at this apparatus when its record is decidedly against them is amusing.

As we now take girls from sixteen, we naturally do not reject a growing girl, when she is otherwise suitable, for the sake of half an inch, but we do find the impossibility of short operators reaching the multiple in some new exchanges. Looking ahead, we can all appreciate that a short supervisor is at a disadvantage compared with a tall one, and it is indeed a pity that no one "can by taking thought add an inch to his stature."

With regard to appearance, there are some people who seem never able to discriminate in the matter of dress, especially in the little things. Some come in so untidy a condition, pinned together, or with stained, dirty blouses, that it is obvious if they would come to apply for a situation in such a condition, they would not improve after they had obtained it. Others, on the contrary, are dressed for conquest, and scented with such pungent perfume that we have to air the office afterward. The businesslike girl is attired suitably and cannot be mistaken.

Manner and tone are difficult to judge when the person naturally tries to please, but curtness of answer—and the "superior" air which accompanies it—does not bode well for the politeness which would deal with a troublesome subscriber.

With regard to general intelligence, I am afraid this is not sufficiently trained by modern educational methods, but a fund of natural common sense is indeed valuable to employer and employed, helping both, by its use, over difficulties others could not surmount.

Health must also be considered. I do not underrate the trying nature of the work, but I think its short hours and the conditions under which it is undertaken do not call for more than the average healthy girl. But as staff is based on the "load," and the question of "relief" not always settled to an exchange manager's own ideas, it becomes a serious matter if good attendance cannot be relied on from each individual operator.

(To be continued.)

#### NATIONAL TELEPHONE PROGRESS.

THE number of new stations added during February was 1,744, bringing the total up to 507,809.

GLASGOW DISTRICT.—*Hillhead Exchange*.—The extension of the No. 1 C.B. equipment by 580 lines has been completed.

LIVERPOOL DISTRICT.—*Bootle Exchange*.—The No. 1 C.B. equipment for 1,080 lines which has been installed in a specially designed building was brought into use on March 12.

MANCHESTER DISTRICT.—*Cheetham Hill Exchange*.—A No. 10 C.B. equipment for 880 lines has been placed on order.

Trafford Park Exchange.—The installation of the No. 1 C.B. equipment for 780 lines in a specially designed building has been commenced and is now in hand.

METROPOLITAN DISTRICT.—*Dalston Exchange*.—Additional C.B. equipment for 480 lines has been ordered, and the installation is now in hand.

London Wall Exchange.—Additional C.B. equipment for 440 lines has been ordered.

#### NEWS OF THE STAFF.

##### OBITUARY.

We regret to announce the death of Mr. B. FISHER, Night Operator at the Kemp Town Exchange, Brighton, who died on March 13 from consumption, the death taking place in the Brighton Borough Sanatorium. The interment took place on March 18, the Company being represented by Miss Gladman, Clerk-in-Charge of the Kemp Town Exchange. Floral tributes were sent from the Company's staff, inmates of the Sanatorium, and Mr. W. W. Wood, the latter being a gentleman who has shown considerable kindness to Mr. Fisher in the time of extremity. Mr. Fisher died at the early age of 35, and has left three children to mourn his loss. A sad feature of the case is that only last year his wife pre-deceased him, so that the little ones are very nearly friendless. The two younger one are being taken care of by the Brighton Guardians and means are being taken to find a suitable opening for the oldest boy, who is of the age of fifteen, and who is at present employed by Mr. Wood.

We have to announce the death of Instrument Fitter J. T. MCKENZIE which took place on Saturday, March 12. Mr. McKenzie had been four and a half years in the Company's service and in this comparatively short time he gained the esteem and goodwill of his fellow employees who have now arranged for a token of their practical sympathy being forwarded to Mr. McKenzie's widow.

We regret also to record the death at the early age of 29 of Mr. ARTHUR ATKINSON, Leeds, which occurred in January last. He entered the Company's service on June 6, 1897, as office boy, and was a district office clerk for over eleven years. Latterly he was transferred to the Contract Department. He was a man much esteemed by all who came in contact with him.



## DEVELOPMENT STUDIES AND BLOCK CANVASSING.

By J. L. MAGRATH, *Edinburgh.*

MR. TAYLOR's and Mr. Elliott's articles in the February issue are of particular importance, and it is an interesting coincidence—if it be coincidence and not design on the part of the Editors—that, dealing as they do with kindred matters, they should appear simultaneously. The ideas detailed are, generally speaking, so much in accord with plans in operation here that my comments may be permitted without much question or explanation.

In January, 1908, a serious attempt was made in Edinburgh to estimate the probable development up to the end of the license. It was a big job, and it used up the services of the majority of the contract office staff for some five weeks. The initial method adopted was the supply by the engineer of a series of blue prints covering the entire territory to be surveyed, these having plotted on them the position of each distributing pole, and the area served by it. Large areas were divided into zones as follows:—"A," up to 150 yards distance; "B," from 150 yards to 260 yards; "C," from 260 yards to 390 yards; and "D," over 390 yards. This, however, is I conceive, not essential in every case, and was adopted on the occasion referred to under a scheme devised in the Engineer-in-Chief's office for estimating distributing costs.

The men detailed for the work were supplied with the prints, and a systematic survey of each area, and a rigidly accurate count of all premises within that area—except those obviously hopeless—were demanded. In residential districts the size and probable rent of the houses were taken into consideration, and all over, each man was instructed to supply the fullest information obtainable in respect of his area—the quality of the locality, the business position of the people, their attitude towards telephone service, probable building extensions, possible special installations, and so on.

Having got the figures, we subdivided them into actual subscribers, and from the remainder made a careful and reasoned attempt to estimate the probable increase. The percentage taken varied, of course, in accordance with the quality of the locality under review. The past rate of increase in certain areas was considered, but in most cases this proved of little value in estimating future development. The figures were interesting, and formed a sort of tool with which to work; but they could not be taken as a guide, and any attempt to treat them as such was speedily abandoned. Mr. Taylor is, I think, absolutely right in his idea that an actual survey is essential, and the more studies are undertaken the clearer, I believe, will this point be demonstrated.

After this lapse of time my reflections on the work done then may be summed up very briefly. Firstly, we did not get sufficient time. A survey, even of one area, should be considered and reconsidered and again considered; and I submit that months instead of weeks should be devoted to the question of the possible development in a big city. The aim was rather to be conservative than over-sanguine, and here and there accordingly we have had to revise our figures. Secondly, removals have on occasions and in some areas upset former calculations. The transfer of a subscriber from one area to another is something impossible to forecast; where a migration occurs in large numbers to one area it may play the dickens with your figures. A modern block of offices, of which there is no indication at the time of the survey, is erected. People in other areas tumble over one another in their eagerness to obtain tenancy: there is a boom, and the place fills up in no time. Your figures may have been absolutely correct under the old conditions, but in circumstances such as these—with practically everybody already a subscriber—the necessity for a speedy re-survey is very obvious. This is something, I think, which is likely to happen everywhere: but it may appear more formidable in Scotland, where all removals practically take place at the one time.

Another point for which allowance has to be made is the gradual and increasing conversion of party line subscribers into direct line subscribers. With the withdrawal of the two-party flat rate and the ten-party rate, there is bound to be an increase in the number of direct lines; and it is not now sufficient simply to plot out existing subscribers, many of whom, in a given area, may be on

party lines. It is necessary to take into account the probability of these being converted into direct lines, and to make the estimate accordingly.

Like Mr. Taylor, I have taken a considerable interest in this fascinating subject. It is a side of our business of extreme value, not only to the engineers, but also to the contract staff. Properly applied and followed up, it ought to be an invaluable guide to the getting of new business in areas which can be readily supplied with service. This being so, the question of block canvassing is naturally entered upon. In Edinburgh we are now working on lines somewhat similar to those detailed by Mr. Elliott. An ordinance survey map is divided into canvassing districts; "A," "B," "C," and so on. These in turn are subdivided into blocks, which actually represent the engineers' distributing areas, and are numbered accordingly. Regular advice is received from the engineer's office as to the state of the plant in each area, and this is represented on the map by coloured pins. Thus, black pins indicate that the area concerned is "full up"; white pins signify relieved areas; blue pins indicate areas where the capacity is limited to, say, half a dozen circuits, and where, consequently, it is necessary to exercise care in taking orders. Areas unpinched are clear, and the engineers' advice keeps us informed as to how these are encroached upon.

For canvassing purposes, the cards, both "new business" and "unsuccessful interview," are filed in accordance with the distributing areas. Each area will be subdivided into streets, and a card will be written for each occupant of premises—with due regard, of course, to the possibilities and surroundings. It is anticipated that every possible subscriber will thus in time be noted, and that we will have a complete list of actual and possible subscribers street by street; the "new business" cards giving us the former, and the other cards the latter. Removals will be keenly watched, and transfers from one area to another noted and recorded. To get such a system of recording into full operation takes, naturally, some time, more especially as it is not desirable to keep outside men indoors on clerical work; but it is believed to be worth doing. With Mr. Elliott's claim for the advantages of systematised work no contract man, I think, can disagree.

To keep the canvass in accord with the survey figures is now our aim, and from time to time we are advised as to the number of circuits working at each distributing pole, from which it is an easy matter to arrive at the number still wanted. Mr. Taylor has, however, struck an obvious point in mentioning the possibility of additional men being required. This may not be so requisite in districts where no development study has been made, but in surveyed centres it appears to me to be a necessary condition if the estimated figures are to be arrived at. Even where an increase of staff may be dispensed with, it seems obvious that, as the better areas are filled up and the second and third-rate ones tackled, the rate of growth will slow down. From which it may be reckoned that, in the concluding period of the license, the development will lessen and the expenses increase, the desired standard of cost in proportion to revenue will go by the board, and the monthly comparative statements from Head Office be of little beyond academic value.

Mr. Taylor's emphasising of the necessity of putting down the plant within a reasonable period after the survey, touches upon another essential condition. You make a study of a given area, reckoning generally the time at your disposal from the date at which you make the study. If the scheme be delayed and haggled over, and postponed indefinitely, the chances are against your figures being reached.

The whole subject of development studies and relative canvassing is one of surpassing importance, and I make no apology for this lengthy contribution to it. Its value is bound to be more clearly recognised every day, and a stimulated and expressed interest throughout the country ought to be of considerable benefit to all of us.

### THE NATIONAL TELEPHONE STAFF BOLTON DISTRICT BENEVOLENT SOCIETY.

THE society was formed in September, 1908, and the good work carried out is fully appreciated by all its members. Since the inauguration sixteen grants to the value of £20 9s. have been made to the members and donations totalling to £9 9s. to the various infirmaries in the Bolton district. The total number of members is 148, which represents 84 per cent. of the total staff employed in the district.



## The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. V.]

APRIL, 1910.

[No. 49.]

### THE SETTLING DOWN OF THE MEASURED RATE.

OVER three years have now elapsed since the measured rates were introduced into this country, and the general popularity which they have earned has justified the policy of the Company up to the hilt. The measured rate is so essentially and inherently fair in principle that, although in matters of detail, the present rates might be amenable to some slight re-adjustment, any opposition which it has met has been easily encountered and overcome. The chief objection to the new rates was made by the Chambers of Commerce representing the views of the large user, whose objections were not founded on principle, but were rather of a special and personal character. The large user, who pays a stated sum a year, for which he can make an unlimited number of calls is, in fact, in the position of a man who has made an uncommonly good bargain, and who is enjoying a privilege of which he does not wish to be deprived. His arguments against the new rate, therefore, were of an interested nature, and did not bear close criticism. What arguments could be successfully employed against a rate under which a man pays only for the amount of telephone service he requires? Under this system of charging he can bargain in advance for a large or small number of calls according to the length of his purse and the nature of his business, and if he underestimates he can always make additions, while if he overestimates he is not penalised—moreover, is not asked to pay a rate which has been averaged out to cover the need of the busy man whose telephone is in use all day, as is the unlimited service subscriber.

On the other hand, the new rates have a feature which appeals strongly to the really large user who desires to be up to date and have the telephone everywhere; for the private branch exchange provides for hiring additional telephones and additional lines at a very low rate, and large blocks of calls can be purchased thereunder

at a figure decreasing in rate as the block increases in size. Under such a tariff the progressive merchant's ideal of a telephone on every desk can be realised. Numerous subscribers have adopted this rate of their own choice, and have never regretted it.

The measured rate, therefore, has found general favour; it has imperceptibly settled down as the Company's standard rate without strife or friction. The principle of leaving undisturbed the existing agreements of the subscribers—which the Company maintained throughout the introduction of the charge—silenced the fears and opposition of the large users; and most other objections were of a flimsy character and easily disposed of. If evidence were required of the popularity of this rate it would be supplied by the steady flow of orders which have come in during the period of its ascendancy, and there is no doubt that many now enjoy the benefits of the service who never entertained the idea of it before.

Whilst on the subject of the measured rate we take the opportunity of returning for a moment to the question of the frivolous call, to which the *Zeitschrift für Schwachstromtechnik* again reverts in its February issue (No. 3). We are reluctant to continue the discussion, and shall not refer to it again; but when we are told that if a frivolous call is that for which a subscriber does not pay, then, as there are no unpaid-for calls either in Germany or England, the frivolous call does not exist, we can only say that we thought it unnecessary in our February article to state explicitly "pay extra" instead of "pay." Of course, the subscriber pays his annual rate, as he pays his water rate; and viewed in the same light every cup of cold water given to the thirsty undoubtedly costs the giver something. If a subscriber may make 10,000 or 100,000 or any number of calls for a certain sum a year, it is quite obvious that whatever number of calls a year he makes he is paying a certain fraction of a penny each for them. But whether he pays a tenth or a hundredth of a penny per call he pays the same annual charge for the whole; and for every call above the number made on occasions of business and social necessity, and for every call made by his clerks, his typists, his office boys, his family, his friends, his man-servant and his maid-servant, he pays no more. Experience has shown very clearly that if he paid so much per call he would take good care that these supernumerary calls were not made. These we call "frivolous" calls. But need we labour the point? We think our German contemporary understands our meaning very well.

### CERTAIN TELEPHONE CRITICS.

AMONGST those who, according to Sir W. S. GILBERT, "never would be missed," was

The idiot who praises in enthusiastic tone

All centuries but this and every country but his own.

The telephone critic is a shining example of this genus, except that he seldom praises the telephone in any age or country. He occasionally, however, makes an exception in favour of America, whilst another sub-genus owns to a preference for Sweden or Switzerland, for not very recondite reasons.

The New York system, to the excellence of which we have often testified, has received another compliment of a kind to which it must by now be pretty well accustomed. We are informed that six officials of the Parisian telephone service are going to the



American city for a thorough practical training in telephone methods. The representatives of more perfect telephone systems than that of Paris have in the past learnt much from New York, and there should be no doubt that the present visits will produce the happiest results.

But now the telephone critic comes in. The humorous artist of a large Boston daily paper depicts the visit of the Paris telephone students. Without troubling to ascertain the rank of the students, he imagines them to be operators instead of engineers. Accordingly, the visitors are represented as three extravagantly befrocked and be-hatted young ladies for whom the gifted artist has evidently drawn on his memories of American-French farces. They watch curiously a somewhat fluffy and frivolous-looking damsel who reads a novelette at the switchboard and refreshes herself from a box conspicuously labelled "candy." Underneath is the legend: "They came over for a few pointers!"

This, then, is the popular criticism of what is perhaps the best telephone service in the world. We do not mean by this that it is the verdict of the business men and *habitués* of the telephone in New York and other large American cities; far from it, they have shown themselves large-minded and enterprising in matters connected with the service. What we do mean is that, however good a service may be, there is always a large section of the public who have not got beyond the novel-and-sweetmeat stage in their conception of telephone operating, and that they will always find a humourist in the press to voice their sentiments. Operating may be perfected to the last degree of human excellence, supervision increased, mechanical and automatic devices multiplied to the obviation of all imaginable troubles, but at the first slight delay or difficulty, the unpractised and casual telephone users' imagination flies back to the independent, unsupervised young lady with the novelette and bag of sweets. New Yorkers, Bostonians, Londoners, Berliners or Parisians—they are all the same.

### THE TELEPHONE MASONIC LODGE.

By special dispensation the regular meeting of the members was held at the Gaiety Restaurant on Feb. 26 instead of Feb. 19. Bro. P. P. Kipping, W.M., occupied the chair, and was ably supported by the following officers:—Bros. Stanley J. Goddard, S.W.; F. A. B. Lord, J.W.; F. O. Harke, L.R., I.P.M.; C. E. Tattersall, treasurer; P. Kenny, secretary; A. F. Paddon, S.D.; W. M. France, J.D.; W. J. Downes, A.D.C.; J. E. Pullin, I.G.; V. Baldwin, organist; F. E. Sims, R. H. Kenway and J. R. Gall, stewards. Bros. A. L. De Lattre, T. E. Devonshire and F. Adley were advanced to M.M.'s, and Bros. Alfred Rawlinson (N.T.Co.), W. H. Matthews (G.P.O.) and Bernard M. Brown (G.P.O.) were initiated into the mysteries of the Order. The Senior Warden, Bro. Stanley J. Goddard, was unanimously elected Worshipful Master of the lodge for the ensuing year, and Bro. C. E. Tattersall the treasurer. The following brethren were elected to serve on the G.P.C.:—W. M. France, J. M. Shackleton and A. L. De Lattre.

Amongst the visiting brethren who subsequently dined with the members of the lodge were W. Bro. R. Percy Simpson, P.D.G.D.C., secretary Royal Masonic Institution for Girls; Bros. A. M. Barnard, L.R.; W. S. Wilson, P.M.; W. N. Rodger, and S. Cole. In responding to the toast of the "Grand Officers," Bro. Simpson made a strong appeal on behalf of the three great Masonic Charitable Institutions, and in particular urged the brethren to support Bro. Kipping's list as he was representing the lodge at the festival of the R.M.I. for Girls on April 6, when H.G. the Duke of Devonshire will occupy the chair. Bro. Kipping subsequently announced that the donations placed on his list that evening amounted to £160, and he expressed the hope that it would reach £200 before the date of the festival, so that the Telephone Lodge might early take its place as a generous supporter of the masonic charities. An excellent musical programme was arranged by Bro. Baldwin, the organist to the lodge.

Bro. Stanley J. Goddard, the Worshipful Master Elect, will be installed in the Chair on Saturday, May 28.

### HIC ET UBIQUE.

THE annual meeting of officers is fixed for Friday, May 27. The subject for discussion has not yet been made known, but it will turn on practical politics and economics. The sixteenth annual staff dinner will take place at the Empress Rooms of the Trocadero Restaurant on the evening of the same day.

CONSTANT users of the telephone, says the *Liverpool Courier*, have some funny experiences at times. As often as not these arise out of the mistakes of the operators in calling up the wrong numbers, a class of error that is all too frequent. A subscriber wishing to speak the other day to a friend asked for a certain number. Instead of being put on to say "oooo Central" he was switched on to "oooo Royal." In order to guard against the occurrence of any such mistake he took the precaution to inquire, "Is that So and So's brewery?" Evidently there was a thirsty soul at the other end of the wire, for the reply came back in a regretful sort of voice, "No, I wish it were."

M.A.P. has a story of a girl who travelled from San Francisco to New York to hear Tetrizzini sing, but being taken ill in the latter city was unable to go to the opera to hear the prima donna, whose acquaintance she had already made.

She rang up Tetrizzini on the telephone and poured her tale of woe into the singer's ears.

"Well, my dear," answered Tetrizzini, "if you can't come to hear me at the opera you shall hear me sing now. I have an accompanist with me, and if you listen I will sing the 'Mad Scene' from *Lucia* for you."

The girl was delighted. So was the telephone operator who happened to have heard the latter part of the conversation. She notified all the exchanges that were not engaged, and in a few seconds the prima donna had an unseen audience of some hundred or more appreciative telephone operators waiting at telephones all over the town to hear the difficult music sung by its greatest living exponent. It was twenty minutes before the excerpt was finished, and during that time there were more wires "engaged" than ever remembered in the history of the New York telephone.

When the last note died away Tetrizzini took up the receiver and was astounded to hear a chorus of "Brava!"

It is all very pretty; "the unseen audience," the "greatest living exponent" and the history-making number of engaged wires! The latter part of the story especially will afford huge amusement to telephone men. Apart from the inherent absurdity of hundreds of operators in New York being independent and unsupervised for a period of twenty minutes, of the unthinkable neglect of business entailed, of the calm sweeping aside of all physical and practical details which would spoil this delightful arrangement, the transmission difficulties alone of only 100 operators plugging on to a single line would reduce the speaking capacity of the line almost below commercial possibility and we fear the sick girl would hear little of Mme. Tetrizzini unless her sickness had preternaturally sharpened her hearing.

Half a minute's delay in answering by an operator is considered bad; but our paragraphist boldly indulges in twenty! We do not think it was necessary to strain our belief so far even in the interests of journalistic effect.

### CORRECTIONS.

**Telephone Men (Mr. Cowley).**—It is regretted that on p. 243 the date of the formation of the South of England Telephone Company was omitted. It was 1885.

**Power Supply at Small Exchanges.**—By a printer's error D.C. (p. 246) in Mr. Wood's article was transposed to "dry core" and S.C. (p. 247) to "short circuit." They should stand, of course, for "double cord" and "single cord" respectively.

### POST OFFICE INSTITUTE OF ELECTRICAL ENGINEERS.

The following further papers read before the above institution are now obtainable at the prices mentioned:—

"The Theory and Development of Central Battery Telegraph Systems." J. Fraser .. .. .	9d.
"The Education of the Post Office Electrical Engineer." A. W. HEAVISIDE .. .. .	6d.
"Aerial Wire Construction, with special reference to the Elastic Properties of Copper Wire. G. Carr, M.I.E.E. .. .. .	6d.

Application for copies of these should be made with remittance to the Engineer-in-Chief, Head Office.



## THE MAGNETISATION OF IRON.

ABRIDGED FOR THE USE OF JUNIOR MEMBERS OF THE STAFF  
BY G. H. C., Nottingham.

If you take a centimetre length of a conductor or wire carrying an "absolute unit" of current, 10 amperes, and bend it into an arc of 1 centimetre radius, a force of 1 dyne is exerted by that current on a magnetic unit pole placed at the centre. A magnetic unit pole is one such that when placed at a distance of 1 centimetre from a similar pole it attracts or repels this pole with a force of 1 dyne.

The ends of the poles should be far enough removed so that they do not affect the magnets under test, or you would get an entirely different effect. One dyne is equal to  $\frac{1}{444,400}$  part of a lb., or, in another way, 1 dyne nearly equals 1.02 milligrammes.

Now, the unit pole creates unit magnetic field all round it, at a distance of 1 centimetre, and as the conductor is bent into an arc of 1 cm. radius, all parts of it must be standing in unit magnetic field, which is equal to 1 line per square centimetre.

Now, remember that the unit current carrying conductor will experience the force of 1 dyne as well as the unit pole, and if the pole be fixed and the conductor free to move, it will move.

If a pole of 2 units strength be placed in the centre, it will create 2 lines per sq. cm. at unit distance, 1 centimetre, and the force naturally on the current carrying conductor will be doubled. Similarly if the current be doubled in the conductor, the force acting on it will also be doubled. This is irrespective of what strength the field is in which the conductor is placed.

Now, it is quite evident that if we take another centimetre length of conductor carrying the same current and place it in the same strength field, that it, too, will experience the same force.

It follows, therefore, that the force in dynes acting on a conductor carrying a current in a magnetic field is equal to —

- 1st. The strength of the field in lines per sq. cm.
- 2nd. The strength of the current in absolute units.
- 3rd. The length of the conductor in centimetres.

Or symbolically  $F = H C l$

where  $H$  = strength of field.

$C$  = absolute units of current.

$l$  = length of conductor in cms.

Suppose you have a unit magnetic field (1 line per sq. cm.), and in this field you place a conductor carrying absolute unit current, then this conductor experiences a force of 1 dyne.

Now move this conductor 1 centimetre against this force, and what do you do? You do 1 erg of work, but in so doing you cut through 1 line of force. It takes 13,545,000 ergs of work to 1 ft. lb.

If you increase your field to any other number of lines per sq. cm, then the force on the conductor will be increased in the same proportion, with corresponding increases in the work done in moving the conductor 1 cm. in the field. When work is done by a current a back E.M.F. is produced.

Now work done in ergs =  $Q E$

where  $Q$  = quantity of electricity and  
 $E$  = E.M.F.

$$\therefore E = \frac{\text{work done}}{Q}$$

With the intensity of the field or the lines of force in the field at unity, then the work done in moving the conductor through 1 cm. of the field, and so cutting through one line of force, is 1 erg, and the E.M.F. developed in the conductor

$$E = \frac{\text{work done}}{Q} = \frac{1}{1} = 1 \text{ absolute unit.}$$

If we take two seconds in moving the conductor through the centimetre length of unit field, the work done will still be the same, 1 erg, for work done is independent of the time taken, but we shall have acted on 2 units of quantity, for evidently if the current remains of the same strength then twice the quantity of electricity passes in 2 seconds as does in 1 second.

$$\therefore E = \frac{\text{work done}}{Q} = \frac{1}{2}$$

or the E.M.F. is then only  $\frac{1}{2}$  its former value. Again, suppose we do the same in  $\frac{1}{2}$ -second, then work done = 1 erg and  $Q$  acted on =  $\frac{1}{2}$ .

$$\therefore E = \frac{\text{work done}}{Q} = \frac{1}{\frac{1}{2}} = 2 \text{ absolute units.}$$

100,000,000 of these units equal 1 volt or 1 volt =  $10^8$  C.G.S. units.

This shows that when conductors cut through lines of force, an E.M.F. is generated in them, independent of the current flowing.

This E.M.F. is proportional to the rate of cutting, or in symbols

$$E = \frac{N T}{t}$$

where  $N$  = total lines cut.

$T$  = total number of turns cutting  $N$  lines.

$t$  = time in seconds taken in cutting.

Before you can calculate this field you have to consider two other points, viz., the magneto-motive-force and the magnetic resistance or reluctance as it is called.

$$\text{Now } C = \frac{\text{E.M.F.}}{\text{elec. resist.}}$$

similarly the magnetic effect produced or the total lines of force

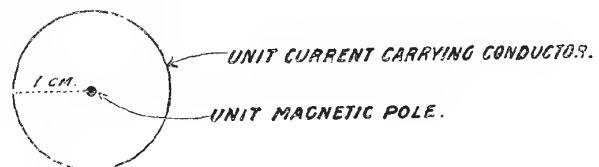
$$= \frac{\text{magneto-motive-force}}{\text{magnetic reluctance}}$$

What, then, is the unit of magneto-motive-force (m.m.f.), and how is it measured? This is measured in a similar way to the unit of current in the case of electricity, by measuring the work done in urging a unit quantity of magnetism round the magnetic circuit.

Now take a solenoid, such as all the students of the Correspondence Classes are familiar with, having number of turns,  $T$ , carrying  $C$ , a current in absolute units. What work will be done electrically in urging or sending unit quantity of magnetism round this circuit?

Unit quantity of magnetism or unit pole has  $4\pi$  lines of force.

The  $4\pi$  is drawn from the surface of a sphere. Referring back to the unit pole in a unit magnetic field, you can imagine it diagrammatically thus:—



The surface of this sphere =  $4\pi (\text{radius})^2$ , and as the radius is unity the surface is  $4\pi$ , which will be the total lines produced by such a unit pole.

As before stated,  $E = \frac{N T}{t}$ , and substituting for  $N$ , the total lines cut,  $4\pi$ , and they cut through  $T$  turns of the solenoid in  $t$  seconds, the E.M.F. developed =  $\frac{4\pi T}{t}$  absolute units.

The quantity of electricity acted upon in this time = strength of current  $\times$  time in seconds, or  $Q = C t$  coulombs.

Now by combining the last two equations you obtain

$$Q E = (C \times t) \times \frac{4\pi T}{t} \\ = C \times 4\pi \times T$$

So you see that the time taken does not influence the work done. Therefore the work done in urging unit pole or unit quantity of magnetism round the magnetic circuit is equal to  $4\pi C T$  ergs.

Whence the m.m.f. =  $4\pi C T$

and as we always measure our current in amperes,



$$\begin{aligned} \text{the m.m.f.} &= \frac{4 \pi C T}{10} \\ &= 1.2567 \text{ ampere turns.} \end{aligned}$$

The next quantity to deal with is the magnetic reluctance, or resistance if you like to call it so, but you must remember that it is preferable to use the word "reluctance" as resistance is usually the quantity representing the waste of energy and there is nothing of the kind in this case. This reluctance can also be measured in a similar manner to resistance in the electrical case.

$$\begin{aligned} R &= \frac{\text{length}}{\text{sec. area}} \times \text{specific resistance} \\ \text{or } R &= \frac{\text{length}}{\text{sec. area}} \times \frac{1}{\text{specific conductivity}} \end{aligned}$$

The magnetic reluctance is also proportional in exactly the same way, to the length of the magnetic circuit, inversely to the sectional area, and inversely proportional again to the specific conductivity of the material to be magnetised, or as it is more commonly known, the permeability of the material.

$$\begin{aligned} \therefore \text{the magnetic reluctance} &= \frac{\text{length}}{\text{sec. area}} \times \frac{1}{\text{permeability}} \\ &= \frac{\text{length}}{\text{sec. area}} \times \frac{1}{\mu} \end{aligned}$$

The permeability, or co-efficient of induction, is designated by the Greek letter  $\mu$ .

The permeability in magnetic circuits can be looked upon as similar to the conductivity in electric circuits and can be understood to mean the conductivity of the material for magnetic lines of force,  $\mu$  varying with the nature of the material and also with the magnetising force.

Now, you see, you can at once write

$$\begin{aligned} \text{Magnetic effect produced or total lines} &= \frac{\text{m.m.f.}}{\text{reluctance}} \\ &= \frac{1.2567 \text{ amp. turns}}{\frac{\text{length}}{\text{s.a.}} \times \frac{1}{\mu}} \end{aligned}$$

or by symbolising the total lines by the letter N.

$$\begin{aligned} N &= \frac{1.2567 \text{ amp. turns}}{\frac{\text{length}}{\text{s.a.}} \times \frac{1}{\mu}} \\ &= \frac{1.2567 \text{ A } t \times \text{s.a.} \times \mu}{\text{length}} \end{aligned}$$

The length must always be expressed in centimetres.

The permeability of air is taken as unity, and all other substances are compared with it. So that when you are dealing with air only, the above equation becomes

$$N = \frac{1.2567 \text{ A } t \times \text{s.a.} \times 1}{\text{length}}$$

which is the same as saying

$$\text{Total lines} = 1.2567 \text{ A } t \text{ per cm. length} \times \text{s.a.}$$

But what you more often want is to get a certain magnetic density rather than the total lines, and this density must be confined to a certain space, or, in other words, you want a certain density of the lines of force in a given sectional area, and the density or lines

$$\text{per sq. cm.} = \frac{\text{total lines}}{\text{s.a.}}$$

$$\therefore \text{in the case of air, called H} = \frac{N}{\text{s.a.}}$$

The letter "H" is used to distinguish it from "N," the total lines.

$$\begin{aligned} \text{Or } H &= \frac{1.2567 \text{ A } t \text{ per cm.} \times \text{s.a.}}{\text{s.a.}} \\ &= 1.2567 \text{ A } t \text{ per cm.} \end{aligned}$$

You must be careful to follow out the formulae of how one fits another or it is impossible to make it clear.

You will thus see that, H, the density of the lines of force per sq. cm. is not dependent on the sectional area of the coil, but simply on the strength of the current  $\times$  the turns, for it follows that if the section is large and the same magneto-motive-force is maintained we shall get the same density as with a small sectional area, and the only difference you will obtain is a larger total number of lines in the former than in the latter.

So far I have only dealt with the magnetisation of air. If you fill the space in the solenoid with a non-magnetic material such as wood, glass, etc., in fact, any other material with the exception of iron or steel, the lines of force will pass through the former non-magnetic materials just the same as they did through the air, and you will thus see that as they offer no reluctance to the passage of the lines of force, they are said to be equal to that of air, so you can at once consider any material except iron or steel as if you were magnetising the same length and sectional area of air.

I will now turn to the magnetisation of iron, confining myself to the one metal to keep the explanations as simple as possible. Take our solenoid again and into the centre place a piece of wrought iron so that it fills the space. Now for a moment just refer to the formula relating to the strength of the field in air, viz.:

$$H = 1.2567 \text{ A } t \text{ per cm.}$$

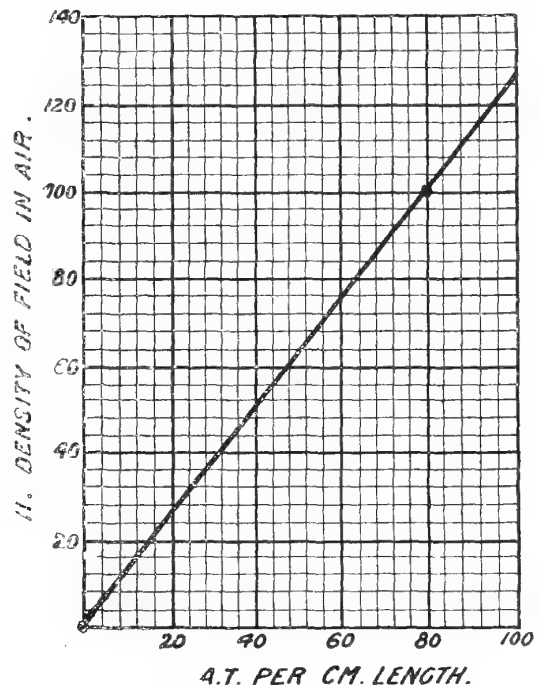
or to make the next explanation more simple

$$H = 1.25 \text{ A } t \text{ per cm.}$$

from which by transposing you obtain

$$\begin{aligned} \text{A } t \text{ per cm.} &= \frac{H}{1.25} \\ &= .8 H \end{aligned}$$

which is to say that the number of ampere turns per cm. length are always .8 times the strength of the field. Now for air this holds good whatever the intensity of the field may be and you could easily plot a curve showing the A t per cm. length horizontally and H, the density of the field in air, vertically. Such a curve will give you a straight line thus:—



$\therefore$  if you desired to produce a field of intensity of 100 for each sq. cm., then you would have to provide 80 turns of wire for every cm. length of the coil. This intensity is independent of the number of sq. cms. you enclose by the turns, so that it does not matter what sectional area your coil is.

Now with the iron core in the solenoid and the A t per centimetre length = 80, what would you expect the lines per sq. cm. to



be? They would be something like seventeen times 100 or 17,000! It is supposed that when the iron is placed in the coil the lines of force are able to crowd together, and the iron has reduced the magnetic reluctance considerably. You could easily consider it thus, one material, air, has been replaced by another material, iron, the former having a very much higher reluctance than the latter, and you are thus able by retaining the same magnetising force to obtain a very much larger increase in the magnetisation.

Or consider it again, electrically, you have replaced the high resistance with a low resistance and retained the same voltage which will give you an increased current.

This magnetisation of the iron or, as it is often called, the magnetic induction, is symbolised by the letter "B."

Now you come to the last quantity—permeability. In the electrical world we only deal with practically four different materials, viz., air, wrought iron, cast iron and steel. I will still confine myself to the one, wrought iron.

When you experiment with a piece of iron by increasing the magneto-motive-force in small quantities and measure the intensity of the field produced at each increase, you will not get a straight line as when taking the solenoid with air in the centre. For a very small magneto-motive-force the intensity of the field is nearly proportional. This can easily be traced out from the curve given in "A" or "B" Courses, but at a certain point a small increase of m.m.f. results in a large increase of magnetic induction, until we come to a certain point when the rate at which the magnetic induction increases begins to diminish, although still increasing, and as you further increase the m.m.f., you reach a point where the magnetic reluctance is increased to an enormous extent.

This is called the saturation point, although you must remember that you can go on increasing the m.m.f., and you may increase the magnetic induction. There is no limit to this, but, commercially speaking, you get the best results at saturation point of the material you are using.

Nothing is gained by trying to go beyond this point.

With good iron this point is reached when the intensity of the field comes to about 16,000 lines per sq. cm., and this would be produced by a magnetising force of 47 A t per cm. length.

Now, just for comparison, what intensity or H would be produced in air for 47 A t per cm. length?

$$\begin{aligned} H &= 1.2567 \text{ A t per cm. length} \\ &= 1.2567 \times 47 \\ &= 59 \text{ (approx.) lines per sq. cm.} \end{aligned}$$

Therefore, you see that the iron increases the intensity of the field 272 times ( $\frac{16000}{59}$ ), and the iron is said to have a permeability 272 times greater than air, or if

$$\begin{aligned} \mu \text{ of air} &= 1 \\ \mu \text{ of iron} &= 272 \text{ at that degree of magnetisation.} \end{aligned}$$

Now, you see, that in this latter instance the degree of magnetisation increases the intensity of the field enormously, and such increase of lines is designated by the letter B. You must not confuse these two letters, B and H, because you will at once notice that if B = H, as it does in the case for air—where  $\mu$ , the permeability or multiplying effect, is unity—B would stand for the intensity of the field just as well as H. They are, in this respect, numerically equal, and, although identical, they are still not the same thing. You want to look upon B more as the effect produced by the magnetising force, and as H represents the magnetising force necessary to produce a certain density of lines in air, B is the density of lines produced in the iron when the same magnetising force, H, is employed. By keeping H constant, and using different classes of iron or steel, or, in fact, any magnetic material, B, the flux density, would vary according to the permeability.

Therefore  $\mu$  depends upon the quality of the iron or material and upon the degree of magnetisation.

And, to sum up, the total number of lines which you could obtain from iron depend on the length, the sectional area, the permeability of the iron and the magnetising force.

If you refer back to the equation for the total number of lines when dealing with air you will find:—

$$N = \frac{1.2567 \text{ A t} \times \text{s.a.}}{\text{length}}$$

$$\therefore N \text{ for iron} = \frac{1.2567 \text{ A t} \times \text{s.a.} \times \mu}{\text{length}}$$

Similarly as H (for air) = 1.2567 A t per cm. length  
the total lines N (for air) = H  $\times$  s.a.

whence the magnetic pressure or induction, H, for air =  $\frac{N}{\text{s.a.}}$

Again as B (for iron) = 1.2567 A t per cm. length  $\times \mu$   
the total lines N (for iron) = B  $\times$  s.a.

and the magnetic pressure or induction, B, for iron =  $\frac{N}{\text{s.a.}}$

So you see that it follows that as

$$H = \frac{N}{\text{s.a.}}$$

$$\text{and } B = \frac{N}{\text{s.a.}}$$

and they both indicate the same thing, and are apparently equal to the same equation, but with this little exception that B includes the permeability,  $\mu$ , that

$$B = H \times \mu$$

$$\text{whence } H = \frac{B}{\mu}$$

$$\text{and } \mu = \frac{B}{H}$$

## CORRESPONDENCE.

### EARTHING OF TELEPHONE BATTERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

TELEPHONE men of the present day regard the earthing of the positive pole of the main battery as standard practice, and, as a general rule, do not enquire why the positive, and not the negative, pole should be earthed, as is generally the case in electric tramway and railway systems.

The writer has searched both English and American text books and periodicals to ascertain the real reason, but so far without success.

Perhaps there are other readers of the JOURNAL interested in this question who will be kind enough to explain and give any references they possess to articles on this subject, if there be such.

Manchester, March 16.

J. P. GARNER.

### SUBSCRIBERS' APPARATUS CARDS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the cards which are kept in the test room, it becomes evident daily that their value is an increasing factor, and it therefore becomes necessary that their correctness and reliability should be unquestioned, especially in those districts where perhaps one or two changes of system have taken place and the rental registers are unreliable; notably in the case of where magneto systems have been changed to C.B. systems. This trouble was recently appreciated in our district, and for that purpose a very careful check was taken

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W. 729.	I. W. 730.	I. W. 731.	I. W. 732.	I. W. 733.	I. W. 734.	I. W. 735.	I. W. 736.	I. W. 737.	I. W. 738.	I. W. 739.	I. W. 740.	I. W. 741.	I. W. 742.	I. W. 743.	I. W. 744.	I. W. 745.	I. W. 746.	I. W. 747.	I. W. 748.	I. W. 749.	I. W. 750.	I. W. 751.	I. W. 752.	I. W. 753.	I. W. 754.	I. W. 755.	I. W. 756.	I. W. 757.	I. W. 758.	I. W. 759.	I. W. 760.	I. W. 761.	I. W. 762.	I. W. 763.	I. W. 764.	I. W. 765.	I. W. 766.	I. W. 767.	I. W. 768.	I. W. 769.	I. W. 770.	I. W. 771.	I. W. 772.	I. W. 773.	I. W. 774.	I. W. 775.	I. W. 776.	I. W. 777.	I. W. 778.	I. W. 779.	I. W. 780.	I. W. 781.	I. W. 782.	I. W. 783.	I. W. 784.	I. W. 785.	I. W. 786.	I. W. 787.	I. W. 788.	I. W. 789.	I. W. 790.	I. W. 791.	I. W. 792.	I. W. 793.	I. W. 794.	I. W. 795.	I. W. 796.	I. W. 797.	I. W. 798.	I. W. 799.	I. W. 800.	I. W. 801.	I. W. 802.	I. W. 803.	I. W. 804.	I. W. 805.	I. W. 806.	I. W. 807.	I. W. 808.	I. W. 809.	I. W. 810.	I. W. 811.	I. W. 812.	I. W. 813.	I. W. 814.	I. W. 815.	I. W. 816.	I. W. 817.	I. W. 818.	I. W. 819.	I. W. 820.	I. W. 821.	I. W. 822.	I. W. 823.	I. W. 824.	I. W. 825.	I. W. 826.	I. W. 827.	I. W. 828.	I. W. 829.	I. W. 830.	I. W. 831.	I. W. 832.	I. W. 833.	I. W. 834.	I. W. 835.	I. W. 836.	I. W. 837.	I. W. 838.	I. W. 839.	I. W. 840.	I. W. 841.	I. W. 842.	I. W. 843.	I. W. 844.	I. W. 845.	I. W. 846.	I. W. 847.	I. W. 848.	I. W. 849.	I. W. 850.	I. W. 851.	I. W. 852.	I. W. 853.	I. W. 854.	I. W. 855.	I. W. 856.	I. W. 857.	I. W. 858.	I. W. 859.	I. W. 860.	I. W. 861.	I. W. 862.	I. W. 863.	I. W. 864.	I. W. 865.	I. W. 866.	I. W. 867.	I. W. 868.	I. W. 869.	I. W. 870.	I. W. 871.	I. W. 872.	I. W. 873.	I. W. 874.	I. W. 875.	I. W. 876.	I. W. 877.	I. W. 878.	I. W. 879.	I. W. 880.	I. W. 881.	I. W. 882.	I. W. 883.	I. W. 884.	I. W. 885.	I. W. 886.	I. W. 887.	I. W. 888.	I. W. 889.	I. W. 890.	I. W. 891.	I. W. 892.	I. W. 893.	I. W. 894.	I. W. 895.	I. W. 896.	I. W. 897.	I. W. 898.	I. W. 899.	I. W. 900.	I. W. 901.	I. W. 902.	I. W. 903.	I. W. 904.	I. W. 905.	I. W. 906.	I. W. 907.	I. W. 908.	I. W. 909.	I. W. 910.	I. W. 911.	I. W. 912.	I. W. 913.	I. W. 914.	I. W. 915.	I. W. 916.	I. W. 917.	I. W. 918.	I. W. 919.	I. W. 920.	I. W. 921.	I. W. 922.	I. W. 923.	I. W. 924.	I. W. 925.	I. W. 926.	I. W. 927.	I. W. 928.	I. W. 929.	I. W. 930.	I. W. 931.	I. W. 932.	I. W. 933.	I. W. 934.	I. W. 935.	I. W. 936.	I. W. 937.	I. W. 938.	I. W. 939.	I. W. 940.	I. W. 941.	I. W. 942.	I. W. 943.	I. W. 944.	I. W. 945.	I. W. 946.	I. W. 947.	I. W. 948.	I. W. 949.	I. W. 950.	I. W. 951.	I. W. 952.	I. W. 953.	I. W. 954.	I. W. 955.	I. W. 956.	I. W. 957.	I. W. 958.	I. W. 959.	I. W. 960.	I. W. 961.	I. W. 962.	I. W. 963.	I. W. 964.	I. W. 965.	I. W. 966.	I. W. 967.	I. W. 968.	I. W. 969.	I. W. 970.	I. W. 971.	I. W. 972.	I. W. 973.	I. W. 974.	I. W. 975.	I. W. 976.	I. W. 977.	I. W. 978.	I. W. 979.	I. W. 980.	I. W. 981.	I. W. 982.	I. W. 983.	I. W. 984.	I. W. 985.	I. W. 986.	I. W. 987.	I. W. 988.	I. W. 989.	I. W. 990.	I. W. 991.	I. W. 992.	I. W. 993.	I. W. 994.	I. W. 995.	I. W. 996.	I. W. 997.	I. W. 998.	I. W. 999.	I. W. 1000.	I. W. 1001.	I. W. 1002.	I. W. 1003.	I. W. 1004.	I. W. 1005.	I. W. 1006.	I. W. 1007.	I. W. 1008.	I. W. 1009.	I. W. 1010.	I. W. 1011.	I. W. 1012.	I. W. 1013.	I. W. 1014.	I. W. 1015.	I. W. 1016.	I. W. 1017.	I. W. 1018.	I. W. 1019.	I. W. 1020.	I. W. 1021.	I. W. 1022.	I. W. 1023.	I. W. 1024.	I. W. 1025.	I. W. 1026.	I. W. 102



## THE PUBLIC CALL OFFICE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to "A. K. M.'s" letter in the February issue, the division of Glasgow's National call office stations into one for every 760 inhabitants was based on the population of 760,000 at the last census.

Owing to the constant exodus from the city it is generally understood that the population has remained almost stationary since, and these figures were taken on that assumption. The increase in reality is small. The number estimated a few months ago by Dr. Chalmers, the city's medical officer of health, was 800,410.

The number of call offices outside the municipal boundary are relatively small and were left out of reckoning.

As regards the estimate of one call office for every 500 inhabitants when the Post Office (late Corporation) stations were added, I should explain that the article criticised, although published in the December 1909 JOURNAL, was an abridged report of an essay read over a year before that date to the Glasgow Telephone Society and if "A. K. M." will take the directory for that period he will find the estimate not very far out.

Hull's call office development is admittedly good but the comparison I had in mind which gave rise to the assertion of Glasgow's supremacy was amongst the large cities of over 500,000 inhabitants, a comparison in which Glasgow appeared to be easily first.

Glasgow.

J. M. STEWART.

## Re DEVELOPMENT STUDY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. W. F. Taylor's interesting article on the above subject in the February number of the JOURNAL, I agree with him that it is impossible to lay down any definite ruling as to the plant to be provided economically for any scheme until a study has been made.

I am rather surprised to read that the engineer is apt to arrange the position of possible subscribers where the existing subscribers cluster most thickly. Mr. Taylor cannot be expressing his opinion of the modern engineer.

The development card in use in London does not, to my mind, meet all the requirements from a contract manager's point of view; and from an engineer's point of view it is very deficient. Below is given a copy of the development card which has been brought into use some time since in Bristol, and has proved to be indispensable. Every month a list of the spares available in each distributing pole is taken from these cards and forwarded to the contract manager, who has also found the cards invaluable when making development studies.

## B.—CABLE-HEAD CODE.

Working circuits as at 1/1/09	..	..	..	..	15
Number of circuits asked for by contract manager from 1/1/09 to 31/12/1911	..	..	..	..	15
Spare circuits as at 1/1/09	..	..	..	..	10
Number of circuits provided and date 25/3/09	..	..	..	..	8

"Additions" in "roman." "Cessations" in "italic."

W.O. number.	Date used or made spare.	Name.	Address	Code.	No. of circuits available.
2,232	Jan. 26/09	H. W. Hawkins	Montrose Avenue, Clifton	Rm	9
2,287	Feb. 6/09	Bristol Corporation	10, Hampton Park, Clifton	Rm	10
6,151	Feb. 8 09	Brightmans Ltd.	99, Whiteladies Road, Clifton	N	9
6,759	Feb. 20 09	S. Lakeman	"Aberfoyle," Watery Road	C	10
2,266	Feb. 21/09	Evan Lewis	33, Whiteladies Road, Clifton	T	9
7,041	March 5/09	Bristol Tramways Co.	Clifton Down Station (two-Party to D.M.R.)	Rv	8
8,191	May 10/09	C. B. Bains	Aberdeen Road, Clifton (two-Party Working Singly to D.M.R.)	Rv	16

"C" = ceased, "N" = new lines, Rm = removals, Rv = reversions, T = transfers from or to other areas owing to wayleave difficulties, etc.

The following is a brief description of the Bristol card system. One of these cards is made out for each distributing pole in the centre. At the time when the system is commenced the distributing pole has a certain number of working circuits which is shown on the card. From this time onward any addition to or deletion from these circuits is recorded in black or red ink respectively on the card. Reversions are always shown, even if there is no resultant change in circuits. So that from this card it is possible to tell at any time—(1) Circuits that have been joined up; (2) circuits that have ceased, and the dates when such events occurred; and (3) the growth in any part of the area from the date on which the cards were started.

This third item is particularly useful when, owing to wayleave troubles, heavy routes, &c., it is necessary to provide new underground work, and split up

or alter a distributing pole area, as one can tell more readily the future development of the area in question, so that its sub-division or enlargement is more easily accomplished.

In a case where a scheme has been made out, and provision made up to a certain date (say, Jan. 1, 1912), it is very easy to see from this system how the scheme is working out; and how and where the canvassing part of the business should be conducted.

This system requires very little time to keep up, if done daily. It is flexible, as one can easily renew or extend any card without affecting the rest.

The whole of the information is simple, and in a getatable form (very much better than a cumbersome plan).

Up to the present the system has not been found wanting in any respect, and if anyone has any improvements or additions of value to offer, they will be acceptable.

E. L. PRESTON, Engineer, Bristol Centre.

## TOOLS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

EVERYONE who uses tools would do well to read Mr. H. A. Slack's article on screwdrivers in the current number of the JOURNAL. Mr. Slack tells us that the screwdriver is the most abused tool in the workshop, but I am afraid there is no need for this limitation, as it is probably the most abused tool outside the workshop as well as in it. The writer has seen workmen (not N.T. workmen, of course) whose ideas of the purpose of the slot in the screwhead are on a level with those of the cobbler referred to in the article. A certain electrical instrument maker, when engaging a man, just hands him a screwdriver, and directs him to remove a few screws from a piece of apparatus, and from this apparently simple test he knows whether the applicant is worth engaging, or whether he is likely to do more harm to the apparatus he touches than he is worth.

My motive, however, in referring to Mr. Slack's article is not to enlarge on the importance of the subject, as that is self-evident, but to suggest that its author should increase our indebtedness by contributing a companion article on files, for if this tool does not stand first, it runs the screwdriver a very close second in the way it is misused.

Gerrard Street, March 10.

J. H. STEWART.

## STANDARD EXPRESSIONS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

AT a meeting held last session a paper was read entitled "Number please." Many expressions were suggested in place of this, already in use, but none seemed so suitable. The question has, moreover, been discussed in the NATIONAL TELEPHONE JOURNAL, but in spite of all suggestions to the contrary it still remains, and I think rightly remains, with us, and every day and all day the request "Number please" may be heard. Besides this there are many other expressions now standardised and in use, which I do not think could be improved upon, and there are many alterations which have resulted in a decided improvement. For instance, the instruction that when repeating the number to a subscriber the name of the exchange must precede the number has resulted in the elimination of many errors in ringing local subscribers. We have now been carrying out this instruction for some time, and the subscribers have at last got so accustomed to hearing the operators repeating the exchange first that they do so themselves, and so avoid the drag which often occurred in waiting for the name of the exchange, which used to be given after the number, and was very often entirely omitted, with consequent error.

In connection with some of the other expressions, I should like to suggest some alterations:—

"Sorry, called you in error." Some subscribers find it exceedingly difficult to understand this statement. Would not, "I am sorry, it is a mistake," be more easily understood? I think it would.

"Sorry, I don't know; there is no one on your line now." This with the little word "Amen" appended sounds like a short sermon, and is not nearly so suitable as "I will inquire," or "If I want you I will ring you again." Apart from this, it is unnecessary to tell a subscriber there is no one on his line. If there were, he would speak to him. Besides, the reply is very often not at all suitable.

If a subscriber rings up and says, "Well! what do you want?" is it not absurd to reply "I am sorry, I don't know; there's no one on your line now."

"Have you got them?" This is an expression which certainly might be modified, and all operators would be glad of a change.

"Have they replied?" or even "Have you had them?" is much more to the point, because the subscriber knows when you ask him that he has not got them at the moment you are speaking.

With these exceptions, the expressions are generally clearly understood, such as "Temporarily out of service"; although there are people dense enough to want further information when this expression is used, and exception has even been taken to "Two pennies please, one at a time"; and I have been asked if I thought the subscriber silly enough to put in two together. I hardly liked to tell him that from my experience with the average user of a money box, such a proceeding was not improbable.

Telephone Directory.—It is a remarkable fact that subscribers have a strange dislike to refer to the Telephone Directory. Were it a copy of some popular magazine perhaps it might see a little more daylight. I notice that most subscribers either find that the page is out or that they have lost their spectacles, but of course pages will get torn out and spectacles will get lost. We must naturally feel sorry to put our subscribers to the trouble of looking up a number, but the Company having gone to the expense of printing the directories, and issuing them twice yearly, it may seem to some that we are not asking too much when we ask that they should be occasionally used. For this reason we have the standard expression approved: "Will you please look in the directory."

In the event of a subscriber asking for someone whose number does not appear in the current directory, the expression "The number is . . . Will you



please make a note of it?" is a very good rule indeed, and often avoids similar delay on subsequent calls for the same number.

"Number engaged." I was recently asked by a subscriber if I could not suggest an improvement or an alteration in this expression, as he expressed himself as being tired of hearing it, but I am afraid the subscriber will have to get more tired before he can have this expression altered or improved. The same remarks apply to "Junction engaged."

Taken altogether, therefore, the standard expressions call for very little criticism, but I hope those which I have referred to as being capable of advantageous modification may receive further consideration.

Cardiff.

HILDA C. VAN RIEL.

### LONDON NOTES.

MR. F. G. BROWN'S second elementary lecture on "Engineering" was, in some respects, an improvement on the first. As one of the audience put it, "there was more Brown, and less Service Instruction." Many practical points, a knowledge of which could only come from trained observation and experience, were dealt with. The discussion was well sustained.

MR. J. HAYWARD, Local Engineer, Kingston, has gained the St. John's Ambulance Association's certificate. The list of qualified "Ambulance" members of the staff is now fairly large, may one say without being misunderstood that it looks "healthy."

SOME excitement seems to have characterised the semi-final for the Clay Challenge Cup at Ilford. Salisbury House, who hold the trophy, were three goals at half-time, Head Office, their opponents, not having scored. As the result was a win for the latter by four to three, the complete reversal of the game's fortunes in the second half is apparent. The Embankment men were evidently the better stayers. At this stage of the competition the following summary of the matches played will doubtless be of interest:—

#### First Round.

Salisbury House .. ..	3	Workshops .. ..	2
Head Office .. ..	2	Western .. ..	1
White Lion Street .. ..	5	London Wall .. ..	1
South East .. ..	14	Paddington .. ..	1

#### Second Round.

Head Office .. ..	4	Salisbury House .. ..	3
South-East .. ..	1	White Lion Street .. ..	0

Final (to be played).  
Head Office v. South-East.

At the annual meeting of the new board of delegates of the Hospital Saturday Fund, three of the Company's representatives, Messrs. Buckeridge, Wilkinson and Sandell, were appointed on one or other of the standing committees. Two delegates have also been elected to seats on the executive. A very keen interest is taken in the work of the fund by several members of the staff.

THE North-Eastern "Smoker" is now a hardy and welcome annual. This year more commodious quarters were necessary, the Queen's Hall at the "Three Nuns" Hotel being quite filled. In addition to most of the Metropolitan Chief Officers, there were representatives present from all the London divisions. Mr. Tattersall was the embodiment of geniality as chairman, and ruled the gathering well with a minimum of speech. Mr. Clay, who responded to the toast of "The Visitors," was very happy in his stories and reminiscences. The musical programme was excellent. The committee are certainly to be congratulated on a success, and on everybody having gone home happy. A special feature of the evening was the presentation of a roll top desk to Mr. Martin, Local Engineer, East Ham, on promotion to Kensington, and a clock to Mr. Stephens, Assistant Engineer, Dalston, on the occasion of his marriage. The financial success of the gathering has resulted in a sum of 27s. 6d. being handed over to the benevolent fund.

THE Telephone Society, at its March meeting, had read to it one of the most interesting papers of the session. Mr. G. H. Bryant is to be heartily congratulated on the admirable manner in which he dealt with and presented his subject, "The Telephone Exchanges of London." The clearness of expression in the paper was accompanied by an equal clearness in articulation, and in the explanation of various diagrams. The title was more comprehensive than the matter, as Mr. Bryant wisely confined himself to the electrical branch of the subject, thus avoiding the pitfall of saying too much about things in general, and too little about one thing in particular. The discussion, while not raising many new points, was excellent, and gave a good finish to a successful meeting.

THE Avenue Cricket Club provided a capital concert at the Bishopsgate Institute on Feb. 26. The evening was voted a most enjoyable one, and great praise is due to Mr. F. Saunders, the Musical Director, and all who assisted him. The club is this year adopting a more ambitious title, "Avenue" being converted into "Metropolitan." It is hoped that this change will result in many lovers of cricket on the Metropolitan staff becoming members. Mr. Clay has accepted the presidency, and that, it is hoped, will give an impetus to recruiting. The entrance fee is 1s. and annual subscription 5s. Mr. W. T. Ashton, London Wall, the financial secretary, will be glad to hear from intending members. A list of fixtures will be issued soon.

AN exchange line contract has just been obtained from the Grand Duke Michael of Russia for his residence at Hampstead.

THERE was a gratifying attendance of 230 to hear Mr. Deane's paper on "The Telephone Load Line" at the Telephone Society's traffic meeting on

March 15. Unfortunately the time for discussion was short, but an adjournment to the next meeting on April 18 was arranged. The paper was well illustrated by slides of curves and statistics, the former being particularly helpful.

SINCE the middle of last year, when a special committee of Chief Officers undertook the charge of all matters connected with the JOURNAL in London, the circulation has increased by 50 per cent. This desirable result has been mainly due to the efforts of the agents who distribute and push the sale of the JOURNAL in the various districts: they will be glad to hear that their work has been so successful.

THE Benevolent Society held a successful whist drive at "Ye Mecca" on March 16. An unrehearsed and unexpected incident was a raid by an imposing force of City police, consisting of two inspectors. Whether an infringement of the Gaming Acts took place is not yet known, but as the Metropolitan Superintendent's name was given by the secretary to the police officers, developments are anxiously awaited. His probable early appearance at the Guildhall as a defendant did not affect Mr. Clay's good spirits when at the close of play he presented the prizes to the winners. As all the prizes were kindly given by several of the Company's officers, it is hoped that a substantial benefit will result to the benevolent fund.

THE local committee of the Staff Transfer Association have nominated for election to the central committee those London members of the staff who were proposed last year. It is intended to hold the annual meeting of the Metropolitan members of the association early in April. As the new local committee will be appointed, and there will doubtless be speeches on the position of the staff's claims, there ought to be a large gathering.

As the papers for the Telephone Society's competitions must be in prior to the publication of the JOURNAL, any appeal for a large number of entries is now too late. It may be said, however, that all sections of the staff are well catered for, and it is to be hoped that the number of competitors will be such as to justify the committee's enterprise. In order to enlarge the circle of interest, the age limit has been altered to 30, a wise step which should result in an increased number of good-class papers. There are three prizes of 21s. each. The Traffic branch has also issued an attractive programme of competitions, the subjects of two of the classes being fixed, and the other two open. Four prizes of 15s. each are offered.

THE Dalston staff had a good time at their "social" on March 12. The novelty on the programme was a postcard competition, but the report of the proceedings fails to make it clear exactly what that means. Music, dancing and games filled up the remainder of the evening.

### GLASGOW NOTES.

THE usual meeting of the National Telephone Society was held in the Technical College on March 9 at 8 p.m., when Mr. Gilbert presided. Two papers were read, viz., "Capital and Revenue," by Mr. J. M. Anderson, and "Notes on Wayleave Records and Route Diagrams," by Mr. J. V. Elliot.

Mr. Anderson, after explaining the general principles of his subject, applied them to the Company's business. Diagrams of the Company's capital and revenue accounts and of various types of works orders were exhibited. These the lecturer lucidly explained, paying special attention to allocation. He concluded with an interesting reference to personal capital as represented by an individual's wage earning capacity.

Mr. Elliot kept strictly to the lines of his subject. He demonstrated his system of recording by several diagrams, the ingenious methods of distinguishing the various kinds of poles and conductors arousing considerable interest.

The discussion on the first paper was very animated, and was adequately replied to by Mr. Anderson. Unfortunately lack of time curtailed discussion on Mr. Elliot's.

A visit to the refectory terminated the meeting.

THE fifth meeting of the Operator's Society and Club, which took the form of a "members' night," was held in the Masonic Halls, 100, West Regent Street, Glasgow, on the evening of Feb. 23, when papers on the under-noted subjects by the under-noted writers were contributed.

"Lord Byron, Poet and Man," by Miss I. McKinnon, Operator, Tron Exchange.

"The Value of Books," by Miss J. Findlay, Operator, Argyle Exchange.

"The Observation Office," by Mr. J. Paton, Observation Clerk.

The first two subjects were treated by the writers in an able manner, and each writer was at the close awarded a hearty vote of thanks.

In his paper on the "Observation Office" Mr. Paton dealt with his subject in an explanatory manner explaining the objects and uses of observation work and how the various observations were taken and timed.

Thereafter the fifth meeting of the club was held when a programme of songs, readings, dancing and games was provided, and a very enjoyable evening was spent.

THE Golf Club has obtained permission to hold all competitions over the Post Office course at Carntyne. This is considered a great boon, as the long waits and consequent uncertainty of finishing before dark, inseparable from a public course, are in great measure dispensed with. The first meeting held at the new home was the February Medal Competition, when Mr. D. B. Heberton was returned the winner. The committee hope that with the close of the football season greater enthusiasm will be shown amongst the members, only eight cards having been taken out last month.

THE staff of the Hillhead Exchange held a whist drive and dance in the Osborne Hotel on Friday, March 11, when a most enjoyable evening was spent. There were 31 tables, and during an interval tea was served. There were four ladies' and four gentlemen's prizes.

THE paragraph regarding "Conscience Money" which appeared under "London Notes" in the March JOURNAL, acts as a reminder that even here in Glasgow, the typical city of a reputedly bargain-driving nation, proof has been given that financial morality is not altogether a lost quantity. On July 8, 1908, there was received an envelope containing ten postal orders value £1 and a sheet of note-paper bearing the words, "I send ten pounds to your Company." Judging from the facts that no information was ever elicited, and that the handwriting was obviously disguised, the logical conclusion is that the remittance was "conscience money."

It may be added that in December last sixpence in stamps, apparently the outcome of some minor twinge, was also received from an anonymous source.

THE largest private branch exchange yet secured in the Glasgow area was successfully started in the Glasgow Stock Exchange on March 1. The contract provided for 24 junction lines with 100,000 calls.

AT the recent dinner, over which Mr. W. A. Smith presided, it was remarked that in Glasgow we already had a "Kelvin" Exchange and a "Bell" Exchange, and that in view of the long connection of the chairman with the enterprise in Glasgow the powers that be might give the name "Smith" to some future exchange. In reply, however, the chairman modestly deprecated the idea.

### GLASGOW STAFF DINNER.

THE annual dinner of the Glasgow and district staff was held in the Grosvenor on the evening of Friday, March 4. Mr. W. A. SMITH presided over an attendance of 120, and among others present were Messrs. S. J. Goddard, Walter Webber (the Postmaster of Glasgow), F. Douglas Watson, D. Stewart (Superintending Engineer, Post Office Telegraphs), W. A. Valentine, and J. Macfee (General Manager, Post Office Telegraphs). The district managers and other representatives from the other Scottish districts were also present.

The loyal toasts having been submitted by the Chairman, Mr. S. J. GODDARD proposed "The Company." Speaking of the progress of the National system since he joined the staff in 1892, he said that in 1893 the number of lines administered was 64,041. At present they were administering 392,064 while the gross annual revenue during the period mentioned had increased from £69,644 to £3,225,715. They had now an organisation which was being copied in several parts of the world. They had more than half a million of stations at work, the exact number in operation on Dec. 31 being 503,643. These carried on an average of 1,472 calls per station, so that if they multiplied these figures they would have the full extent of the traffic of the system. The success of the system, of course, depended on the quickness with which the subscriber received his connection. The best method they had of accurately testing that point was from the observation tables in the larger exchanges in England and Scotland. The average time of answer given in the large exchanges throughout the United Kingdom was 5.1 seconds—that was to say that the subscriber obtained the attention of the operator 5.1 seconds after he first called the exchange. Their patriotism in Scotland would be pleased when they learned that the average time of reply in the large exchanges north of the Border was 4.5 seconds. (Applause.) There was a very general opinion among people—who did not know what they were talking about—that the Company was not developing its system, and that it was content to hand over in 1911 an effete and worn-out plant. He did not think he could give any better refutation of that suggestion than by telling them that out of the total number of stations working, 33.9 were on common battery exchanges. As to the future, he thought Mr. Webber knew more about that aspect than he did. (Laughter.) But he thought he was safe in saying that, whether it be the Post Office or any other body who administer the telephones in the future, the one thing evident was that the best man would get to the top. (Applause.)

THE CHAIRMAN, in reply, referred to the strong appeal which the telephone had made to his mind when first introduced. He remembered that when he invested his first sum of money in telephones, the cashier in his father's office said "I suppose I shall enter this as your investment in the air." (Laughter.) He did not require to tell them that the investment was not an unsatisfactory investment for him. It was interesting to think of what the pioneers of the enterprise expected its development to be. In this connection he recalled now, at a dinner held in the pioneering days, he ventured the opinion that a revenue of £20,000 a year might be derived out of Glasgow. That statement was applauded but was regarded with scepticism. The National was not the child of the United Telephone Company, as many of them supposed. It was the grandchild, the connecting link being the Provincial Telephone Company, of which he was one of the founders and directors. (Applause.) At the end of last month the National had 31,335 stations in Glasgow, and when the municipal telephone system was taken over it numbered 12,824. The revenue from these joint stations amounting to a sum approximating £200,000 a year, so that his supposed wild calculation had been exceeded by 1,000 per cent. (Applause.)

MR. F. DOUGLAS WATSON afterwards proposed "The Guests." Mr. WALTER WEBBER, in responding, referred to reforms of the telephone system, and expressed the view that to pay for what one consumed was the regular way of charging, and accordingly he believed that the "measured rate" was the only possible and just method of charging. Speaking personally, he said he looked forward to the time when the area charges would be superseded by distance charges.

MR. W. A. VALENTINE proposed "The Chairman," to which Mr. SMITH suitably replied.

During the evening a capital musical programme was submitted, and the committee in charge of the arrangements are to be congratulated on the complete success which crowned their efforts.

### LOCAL TELEPHONE SOCIETIES.

**Birmingham.**—The sixth meeting was held at the Imperial Hotel, on March 1, when a paper was read by Mr. W. Bagley, of the Engineers' Department, entitled "Practical Economics of Underground Construction."

The seventh meeting was held in the operators' dining room, Central Exchange, on March 15, when papers were read by Mr. E. F. Price, of the Electricians' Department, entitled "Testing out a C. B. Exchange," and by Mr. M. J. Bowes, of the Traffic Department, on "Exchange Management."

**Birmingham Operators.**—The sixth and last meeting of the session was held on March 10, at Queen's College. Miss E. J. Williams was in the chair, and a paper was given by Mr. Napier, of London, on "Traffic," illustrated by lantern slides. The meeting was followed by a social gathering, in which the following members of the staff took part:—Misses Farmer, Jennens, Loach and Moreton, and Messrs. Allen and Silver. A dialogue given by Mr. Baxter and Miss Farmer was much appreciated.

**Blackburn.**—The fifth meeting of the session was held in Swift's Rooms, Blackburn, when Mr. Frost, Engineer, Blackburn, read a paper on "Underground and Overhead Construction." An interesting and useful discussion followed.

**Bolton.**—On Feb. 3 Mr. J. Wilson, Costs Clerk, Bolton, read an interesting paper on "Points on Costing, Measure Rate Accounting, and the Use of the Telephone." He lucidly explained the commercial value of the telephone, and outlined the accounting of measured rate fees.

On Feb. 17 Mr. T. A. Prout, Assistant Provincial Superintendent, gave an interesting and instructive paper entitled "Homely Telephone Analogies." The subject was treated in a conversational manner, and the various lessons driven home in a pleasant yet vigorous fashion. The evening terminated pleasantly in social intercourse.

**Bournemouth.**—The fifth sessional meeting of this society was held on Feb. 14, when Mr. R. Aitken, of Head Office, gave a paper on "Aerial Lead-Covered Cable," which was supplemented by lantern slides. The lecturer made comparisons between open wires, underground and aerial cables, and gave in detail the method of running the latter conductor. At the close of the paper an interesting discussion took place, in which several members of the staff took part. Mr. W. Howe (District Manager) was in the chair, supported by the vice-president, Mr. E. Harper, and 46 members.

The sixth meeting of the session was held on March 14, when Mr. E. Harper gave his paper "The Designing of Telephone Circuits." The subject, which was illustrated by some interesting lantern slides, proved instructive. A discussion afterwards took place, in which Messrs. Howe, Blewdon, Plummer and Beal took part. Mr. W. Howe, District Manager, presided over a meeting of 43 members.

**Brighton.**—A meeting of this society was held on March 14, when the following three competitive papers were read:—"Testing Instruments and Uses," by Inspector Brickett; "How to Become an Instrument Inspector; and Hindrances to Promotion," by Inspector Brackley; "Simultaneous Telegraphy and Telephony," by Fitter Gambier. An interesting discussion followed each paper, and the prize was awarded to Inspector Brackley. Mr. C. F. Moorhouse (District Manager) was in the chair.

**Bristol.**—The sixth and last sessional meeting was held on March 17, when a lecture was given by Mr. C. E. Morgan, Local Manager, Weston-super-Mare, on "The Staff and Education." An animated discussion took place. The lecturer was complimented on all hands for his able handling of so important a subject. After the discussion had ceased, the announcement of the adjudicators relative to the papers given during the session by members of the staff was made. It had been decided that two prizes should be awarded, one of £1 and one of 10s. for the two best papers by the local staff during the current session. Amid much excitement Mr. Perkins, District Manager, announced the result of the adjudication as follows:—First prize, Mr. J. Wilkins, D.O., for his paper on "The W.O. and Telephone Directory"; second prize, Mr. F. G. Eager, for his paper on "C.B. Instrument Design."

**Bristol Operators.**—The last sessional meeting was held on March 3, when the evening was devoted to competitive papers by various members of the staff. Thirty-five of these were received from all parts of the district and fourteen prizes were awarded. Mr. A. Perkins adjudicated upon the papers and, through the unavoidable absence of Mr. R. A. Dalzell, also awarded the prizes to the various winners. Seniors: first prize, Miss A. W. Newbury, "Fire"; second, Miss P. Hawkins, "Cheerfulness." Senior-juniors: first prize, Miss N. B. Hunt, "First Impressions of a Telephone Switchroom"; second, Miss I. Melrose, "The Telephone Operator." Juniors: first prize, Miss L. Shelbourne, "Self-Confidence"; second, Miss J. Yates, "Order Wire Working." Junior-juniors: first prize, Miss W. K. Hook, "Accuracy"; second, Miss I. M. Collins, "Training of Subscribers." Half-time operators' prize, Miss D. Pym (Fishponds Exchange), "Interest." Sub-exchange operators (Bristol Area): first prize, Miss M. Lawrence (Brislington Exchange), "The Sub-Exchange from the inside"; second, Miss D. V. Hazell (Portsmouth Exchange), "Confidence between Subscribers and Operators." Out-centre operators (Bristol district): first prize, Miss M. H. Fryer (Trowbridge Exchange), "The Sub-Exchange Operator"; second, Miss M. Baijant (Chippenham Exchange), "Training of Subscribers"; third, Miss P. King-Smith (Swindon Exchange), "Haphazards." Afterwards amid great enthusiasm the junior member of the society on behalf of all the members, presented Mr. A. E. Coombs (Traffic Manager) and chairman of the committee, with two volumes, viz., *Jack's Encyclopedia* and *Pool's Telephone Hand Book*, as a token of appreciation of the keen interest shown by him in the society.

**Cardiff.**—The sixth meeting was held in St. John's Schoolrooms, Cardiff, on Feb. 17. There was a good muster. The first half of the evening was devoted to competitive papers on "Aerial Cable Work," and papers were read by Foreman Greenfield, Smith and Brydon. The first prize was awarded to Foreman Smith, and the second to Foreman Greenfield. The second portion of the evening was occupied by Mr. J. James with a paper, illustrated with



diagrams, on the same subject. A discussion followed and the evening, which had been an interesting one, was brought to a close.

**Cardiff Operators.**—The sixth and last meeting was held on March 15. The meeting took the form of a competitive night and was the best of the session, both in numbers and enthusiasm. The chair was taken by Mr. B. Waite (District Manager). Five papers were read, as follows:—"The Difference between a Careful and Careless Operator," by Miss W. Merrett; "Operators' Irregularities from a Subscriber's Point of View," by Miss Thorn; "Value and Uses of Auto. Boxes," by Miss Whittle; "Uses and Abuses of the Telephone," by Miss Lathey; "Junction Working," by Miss Bryant. All the papers were exceptionally good. At the request of the committee the vice-presidents, clerk-in-charge and supervisors acted as adjudicators and awarded the first prize to Miss Bryant, the second to Miss Merrett, and the third prize to Miss Lathey.

**Cheltenham.**—The eighth meeting of the session was held on March 8, 75 per cent. of the members being present. Mr. A. R. Wran gave a very interesting paper on "Instrument Maintenance," dealing with subscribers' installations.

**Coventry.** A meeting was held at Priory Row Assembly Rooms on Feb. 15. Mr. E. J. T. Leane presided over a good attendance, the percentage being 80.36 per cent. Mr. Jno. Mewburn, president of the society, gave a paper on "Traffic." This was followed by a paper by Mr. C. Sadler on "The Various Departments and their Expenditure." Discussion was only of a limited nature, the papers themselves taking nearly all the evening.

A meeting was held in the Priory Row Assembly Rooms on March 15. Mr. J. Mewburn, president, in the chair. The attendance of members was 95.2 per cent. A paper was read by W. H. Oliver (hon. sec.) on "The Staff: its Relationship (1) to the Company; (2) to the Subscriber."

**Dublin.**—The fifth meeting of the session was held on Jan. 12. Mr. P. F. Curral occupying the chair. The occasion was a "members' night," and a special prize of 5s. was offered for the best short paper read by any junior member of the society. Mr. E. H. Cassidy read a very interesting and instructive paper on "Primary Batteries." The subject was very ably dealt with, the evolution, construction and principle of primary batteries being discussed.

The sixth meeting of the session was held on Feb. 23. Mr. P. F. Curral occupying the chair. Mr. H. M. Kenworthy read a paper on "Co-operation." The subject was treated in a non-technical style, the all-round benefits derived from inter-departmental co-operation being dwelt upon in an interesting manner. A good discussion followed, and a vote of thanks to Mr. H. M. Kenworthy closed the meeting.

**East Kent.**—The fifth meeting of the session took place on Feb. 25 in the district offices, Dover, when a joint paper was given by Mr. P. C. Langridge (Chief Inspector), Dover, and Mr. F. E. Faithfull (Chief Inspector), Folkestone, on "Central Battery Calling and Cord Circuits." There was a very satisfactory attendance of members. Mr. Langridge has entered his paper for competition in connection with the premiums offered by the education committee.

**Exeter.** The sixth meeting was held on March 1, Mr. F. Squire in the chair. A paper, "Some Points on Engineering," was read by Mr. W. Sim, which mainly covered overhead construction, erection of various classes of supports, running out cables, etc. A general discussion followed, led by the District Manager, Mr. H. Reid.

An extra meeting was held on March 3, at the Y.M.C.A. Lecture Room, when Mr. H. Green, A.M.I.E.E. of the Engineer-in-Chief's Department, read a paper on "Cable Design." The paper was very attentively followed, and a few questions were put at its close. Many of the lecturer's points were illustrated by means of a lantern and slides. Mr. H. Reid again occupied the chair.

The eighth meeting of the session was held on March 8. Mr. P. Humphriss in the chair. A paper on "Costs" was read by Mr. H. Martin. There was a very good discussion taken part in by most of those present.

**Gloucester.**—The sixth meeting of the session was held on March 11, at the "Y" Room, Clarence Street. The chair was occupied by the Provincial Superintendent, Mr. A. Dalzell, supported by the District Manager, Mr. C. Elliott. The Assistant General Superintendent, Mr. Eustace Hare, read a most interesting and instructive paper, entitled "Service Instructions and Discretion," which was received with much appreciation. A valuable discussion was raised, in which many members took part. The meeting was very well attended, members of the Cheltenham and Stroud staffs, including operators, also being present.

**Greenock.**—The fifth meeting of this society was held on Jan. 13, when a paper entitled "Traffic; its Relationship and Responsibilities in Telephone Business," was delivered by Mr. H. A. Frame, Traffic Manager. The lecture was illustrated by lantern slides, and was much appreciated by all the members present.

The sixth meeting was held on Jan. 27, when the evening was devoted to a whist drive, which was entered into with enthusiasm and greatly enjoyed by the players.

**Hastings and Eastbourne.**—The monthly meeting was held on Feb. 23, at the Y.M.C.A. Rooms, Eastbourne, Mr. H. Mallett, of Hastings, giving an interesting paper on "General Exchange Maintenance." Mr. E. Armstrong, Local Manager, Hastings, acted as chairman.

A meeting was held at Hastings on March 16, when Miss Martin, Clerk-in-Charge, Eastbourne, gave an extremely interesting paper, entitled "Helps and Hindrances to Efficient Operating," which was much appreciated by all present. Mr. Curling, Local Manager, Eastbourne, presided over the meeting.

**Hull.**—A series of competitions have been held in connection with the local telephone society, prizes being awarded for the best papers written on each of the following subjects:—"Commercial," "Traffic" and "Technical." Only four members entered the lists for each subject, but some excellent papers were written, the following being judged the best:—Commercial—First prize, Mr. G. H. Cobby; second prize, Mr. A. H. Sergeant. Traffic—First prize, Miss M. Cutting; second prize, Miss Sergeant. Technical—First prize, Mr. T. P. Steel; second prize, Mr. R. T. Mayman. The first four of these papers were

read at the meeting on March 17 to an appreciative audience. The District Manager was in the chair, and at the close of the meeting congratulated the writers, and expressed his opinion that some such means should have been utilised before to persuade the backward members to come forward with their literary efforts.

**Isle of Man.**—The tenth meeting of the above was held on Feb. 25. A paper on the "Petrol Engine" was read by the District Manager. He explained that as the petrol engine, on account of its light weight and portability, was coming into use very much in the Company's service he wished all to understand its working.

The last meeting of the session was held on March 11. The District Manager, by request, explained the principle of the steam motor car. A. Smith, Line Foreman, showed an improved plan of getting up broken wires. The District Manager read a report of the session's work. Prizes for best time-keeping by junior staff were given to Storekeeper, W. Quayle; Clerks, E. Ojaltrough, C. Quayle and T. Cain; Instrument Inspectors, E. Vick and T. Clucas; Labourer, J. Kennedy; Night Operator, H. Kelly. Prizes for papers read were given to J. E. Cowley, Clerk; E. Vick and T. Clucas, Instrument Inspectors. Prizes for suggestions and devices for helping in the work were given to A. Smith, Line Foreman, and W. E. Cain, Instrument Inspector. A special prize for diligence in work was given to J. E. Cowley, Clerk.

**Leeds.**—At the meeting held March 2, presided over by Mr. W. V. Morten, a paper was read by Mr. B. Lister on "Aerial and Underground Cables." The paper gave evidence of much thought and investigation, and was illustrated by diagrams, drawings and samples.

The second of a series of lectures was given to the operating staff at Leeds Central Exchange on Feb. 7. The subjects were "Junctions, Order Wire Working, Cross Area Junctions," and reference was made to "Transmission." A good number of operators were present, and found the lecture very interesting.

**Luton.**—A paper was read by Mr. J. H. Raines, Cost Clerk, on Feb. 28, entitled "Costs," and on March 14 Mr. H. G. Smith, Inspector-in-Charge, St. Albans, gave a paper on "Aerial Cable Construction." Both subjects were treated in a very able manner, and whilst the former endeavoured to show that it is possible to have economy with efficiency, the latter described several instances of apparently difficult and expensive jobs which were made easy and cheap by a careful primary consideration of all the factors. Mr. Smith dwelt at much length on the necessity for judicious staying.

**Manchester.**—On Feb. 11 a paper was delivered by Mr. W. Napier, of Engineer-in-Chief's Department, on "Traffic," which was illustrated by a considerable number of lantern slides of traffic curves and photographs of a number of modern common battery exchanges and operating schools throughout the country. Among other traffic details the new method of operating calls over lending junctions by order wire, known as "tandem order wire working," was dealt with. A number of interesting questions were asked, and suitably replied to. A fairly representative gathering were present, which included several ladies from the Manchester operating staff, and also Mr. Haley, District Manager of Bolton.

On March 4 a paper on "Junction Circuits" was read before the above society by Messrs. J. P. Garner and W. A. Satchwell, both members of the electrical staff. On account of the wide scope of the subject, circuits only used in the Manchester area were dealt with.

The syllabus as regards lectures was brought to a close on March 11, when a most interesting and instructive paper was given by Mr. H. J. Smith on "The Fees Department." The lecture was very much appreciated by the members of the society, and the attendance, which was a large one, was greatly augmented by the presence of ladies from the Fees Department and operating staffs.

**Newcastle.**—The sixth meeting was held at the Roma Café, Grainger Street, Newcastle, on March 1. Mr. R. W. Jackson (past president) was in the chair. Two papers were given, the first by Mr. J. Gwyther on "Traffic," and the second by Mr. A. McEwan on "Training for Telephone Work." After each paper those taking part in discussion were: F. W. Gaskins, R. W. Jackson, E. T. Payne, H. Dent, H. Sadler, A. Brewis, R. Dryden, J. Hastings, H. Waugh and J. Gilroy.

**Northampton.**—A meeting was held in the inspector's room at the Northampton Exchange on Feb. 22, with W. Dickinson in the chair. Papers were given on "Traffic" by Mr. J. Mewburn, and on "Accumulators" by Mr. F. Coote. A discussion followed each paper.

**Nottingham.**—The sixth meeting was held on Feb. 25. A long-expected paper was given by Mr. A. Watts, of Head Office, on "Some Phases of Telephone Design." The paper, which perhaps should be more correctly called an address, was illustrated by numerous lantern slides. Among those present were Mr. J. Scott, Assistant Provincial Superintendent, and Mr. P. G. Head, also of Head Office. Mr. Watts' remarks were closely followed, and great interest was taken in his figures and curves. Eleven members and visitors took part in the subsequent discussion, among those helping being Mr. Scott and Mr. Sibley. The general attendance of members was the best for the present session. Prior to Mr. Watts' paper, Mr. J. Scott presented first prize of an umbrella to Miss H. K. Green for her paper on "Operating" read at the previous meeting of the society. He also presented consolation prizes of purses to Misses E. Cartledge and L. Tuke.

**Nottingham Factory.**—At the meeting held on Feb. 21 Mr. J. W. Ingleton gave a paper on "Accumulators." Their history, importance, methods of manufacture, faults, etc., were dealt with, sample sections of plates being used to illustrate the subject. Miss E. Clements followed with a demonstration of "Enamelling," "Transferring" and "Lacquering" as done in her department. The various processes were fully explained and evoked much interest.

The seventh meeting took place on March 7, 96 present, when Mr. G. C. Pearson, of the Wall Set Department, gave a paper on "Wireless Telephony."

The three systems of "Conduction," "Induction" and "Radiation," were dealt with. The "Orling-Armstrong" method of conduction was briefly outlined, whilst the inductive method was illustrated by experiments and by diagrams. The third system of using electro-static discharges was gone into at some length, the various apparatus being described, and the difficulties met with in practice considered.

**North-Eastern London.**—The fifth monthly meeting was held on Feb. 28 at East Exchange, the vice-president (Mr. H. S. Peck) taking the chair. The paper submitted for discussion was entitled "Notes on Instrument Fitters' Duties," by Mr. A. R. Macfarlane, the Divisional Construction Electrician. The meeting was well attended, and the discussion was both educational and humorous. It is very gratifying to note that the debates at these meetings have become more entertaining and questions more numerous, thereby enhancing the educational value of the society.

**Paisley.**—The fifth meeting of the session was held in Hutton's Restaurant, Paisley, on March 11, Mr. R. Audsley, Local Manager, presiding, when a very interesting lecture was given by Mr. A. W. Grant, Contract Officer, on "The Contract Officer." The lecturer dealt with the various arguments used when interviewing subscribers, which proved very interesting.

**Plymouth.**—On Jan. 3 a paper was read by Mr. W. C. Harris entitled "Instrument Maintenance," and the subject was ably dealt with and fully discussed; 75 per cent. of members were present.

On Feb. 2 Mr. H. Reid, District Manager, Exeter, gave a lecture entitled "Traffic: its Relations to the Service, the Public, and the Company." This paper proved very interesting and instructive, and a number of questions asked were ably dealt with by Mr. Reid. The chair was occupied by Mr. R. A. Dalzell, and 76 per cent. of members were present.

On Feb. 23 Mr. R. Aitken, of the Engineer-in-Chief's Department, gave a lecture on "Aerial Lead-Covered Cables," which was much appreciated. The lecture dealt with the latest methods of erecting cables, and lantern slides were used showing pictures taken of work in progress; 87 per cent. of the members were present on this occasion.

**Portsmouth.**—On Feb. 24 a joint paper was given by Mr. Albany, Contract Manager, Mr. Collins, Chief Clerk, Mr. Legge, Engineer, Mr. Padgett, Electrician, and Mr. Pharo, Traffic Manager, on "A Telephone Subscriber in the Making." Each department detailed the part they took in obtaining orders, running lines, fitting instruments, training the subscriber, and so forth, and an interesting discussion followed. The chair was taken by Mr. S. J. Smith, District Manager, and there was a good attendance.

On March 10 Mr. Stanley Waincoat gave a paper on "Atmospheric Electricity and Wireless Telegraphy." Many interesting experiments were illustrated by apparatus which had been constructed by the lecturer, and he is to be congratulated on the able manner in which he held his audience from the commencement to the finish of his paper. Experiments with Giessler tubes, etc., were carried out, and some very interesting lantern slides shown illustrating lightning discharges, etc. Mr. P. R. Denham, who is always ready to officiate as lantern operator, again did so on this occasion. A discussion was taken part in by Mr. Lewis and Mr. Pharo. The chair was taken by Mr. H. Newnham, Service Inspector.

**Sheffield.**—The sixth and last meeting was held on March 11 before a large attendance. This meeting was reserved for the lantern evening. A large number of lantern slides were shown, which proved both instructive and entertaining.

The annual social gathering in connection with this society was held on March 18, the first half of the evening being devoted to a whist drive, the operators being successful in winning the majority of the prizes, which were presented by the District Manager (Mr. R. C. Bennett). The second half of the evening, after the refreshments, took the form of a smoking concert, under the chairmanship of the District Manager, and during the first part of the evening a phonograph concert was arranged by Mr. Barr (Local Manager) for the benefit of the non-whist players.

The Sheffield operators have decided to form a telephone society. After two preliminary meetings, the first meeting was held on March 4, when a paper was read by Miss K. D. Laing, entitled "Night Operating; its Duties and Responsibilities." There were a fair number of operators present, and discussion followed.

**Southern London.**—A meeting was held on Feb. 14, when a paper on "Traffic" was read by Mr. F. Graves. In view of the nature of the subject, an invitation was extended to the ladies of the exchange, who responded with a good attendance. Slides were used in illustration, and an interesting discussion followed the reading of the paper.

**Stirling.**—The last meeting of the society was held on March 15, when Mr. K. McKenzie, District Engineer, read a paper on "The Telephone Line." There was a good attendance of the members, and a very spirited discussion afterwards took place.

**Sunderland and Shields.**—Owing to the severe snowstorm in the district on Jan. 28 the meeting arranged for that date was cancelled.

The fifth monthly meeting was held on Feb. 25 at Sunderland. Mr. E. Spink presided. A paper on "Correspondence" was given by Mr. J. Martin. Discussion followed, in which the following took part:—Messrs. E. Spink, W. J. Douglass, A. Livingstone, A. E. Tinwell, and R. Scott.

**Swansea.** The sixth and last seasonal meeting was held at the Docks Exchange Hall on March 15, on which occasion a paper was read by Mr. F. Stevens, Assistant Engineer, entitled "Mechanics of Line Construction." There was a good attendance, viz., 36, and 30 visitors, the majority of the latter being members of line staff. Mr. W. J. Hodgetts, vice-president, occupied the chair.

**Swansea Operators.**—The sixth and final meeting of the session took place at the Docks Exchange Hall on Feb. 28, when the following short papers were given by members of the society:—"General Points in Operating," by Miss F. Pritchard; "Call Office Working," by Miss C. Johns; "Switch-board Distribution," by Miss D. Geoghegan. The papers were extremely well

written, and resulted in an animated discussion, participated in by the majority present. The presentation of awards for papers given during the session followed these proceedings.

**Torquay.**—The sixth meeting was held on Feb. 21, when the Provincial Superintendent, Mr. R. A. Dalzell, read a paper, "Problems in Connection with Distribution." The lecturer showed the advantages of distributing in accordance with day and night loads, and the necessity of studying the question minutely before attempting to redistribute the lines at an exchange. Numerous curves and diagrams were shown illustrating the points raised. A number of questions were put to the lecturer, and a good discussion followed.

The seventh meeting of the session was held on March 14, when a paper on "Statistical Records" was read by Mr. F. V. Squire. Mr. G. Williamson occupied the chair, and an animated discussion followed on the points raised.

**Warrington.**—The eighth meeting of the session was held on Feb. 16, when one of the best papers the members of the society have had the pleasure of listening to was given by Mr. Street, of the Engineer-in-Chief's Department, London, on "Dry Air Working." The paper was illustrated by lantern slides.

**Western London.**—The sixth meeting of the session was held at Gerrard Exchange on Feb. 24, upon which occasion Mr. J. C. Fuller read a very interesting paper on "Military Telegraphy and Telephony," illustrated by lantern slides. A quantity of apparatus was shown and explained.

**Weymouth.**—The fourth meeting was held at Butchers' Rooms, St. Thomas Street, on Feb. 14, when a paper was given by Mr. F. W. George (Contract Manager) on "Contract Work," the chair being taken by Mr. Attwooll (Local Manager). The attendance was very good in spite of the inclemency of the weather, and those members who were present spent a profitable evening.

**Wolverhampton.**—A meeting was held at the Midland Café, Wolverhampton, on Feb. 25. Two papers were read, one by Mr. W. S. Kay, Chief Clerk, North Midland district, on "The Development of the North Midland District," pointing out in some interesting comparisons how the districts figures had increased from the start of the district, and also in recent years. The second paper was by Mr. C. Law on "Power Plant." The various connections were lucidly explained from diagrams and models. Both papers were keenly followed and numerous questions were debated and answered. Total present 37, or 46 per cent. of total membership. The chair was taken by Mr. R. S. Grosvenor, Local Manager, Walsall.

**Dundee.**—Mr. W. Brown presided over the March meeting. A paper, "Notes from Common Battery Operating," by Miss A. Martin, was read. Mr. A. Mackenzie read a paper on "Operating," and an interesting discussion followed.

**Brighton.**—A meeting was held at the Duke Street Office on Feb. 14, when an address on "Telephone Work, the Prosaic Present and some Curiosities of the Past, with Special Reference to Office Work," was given by Mr. L. Parsons, Chief Clerk, to a fairly good audience. The reminiscences of old times proved most interesting, and an animated chat followed, one or two suggestions being thrown out as a result, calculated to increase the obtaining of business for the Company. The members present then elected Mr. Parsons as an additional member of the telephone society's committee.

## STAFF GATHERINGS AND SPORTS.

**Edinburgh.**—The operators at Edinburgh held their dance in Aitchison's Rooms, Queen Street, on Feb. 24; 157, including friends, were present. This year the enjoyable gathering was due to the initiative of the ladies themselves.

The last of the series of whist drives of this season was held on March 18. Fifteen tables were played. The prizes were won by Miss J. McKenzie (Fee Department), Mr. David Christian (Leith testroom), and Mr. William Fraser (district office), and were presented by Miss A. St. Clair Johnson, Chief Operator. Thanks were conveyed to her, and also to Miss Arthur and Mr. James Pirie, who have carried out the arrangements this season.

The annual meeting of the Ampère Golf Club was held on March 9. The secretary and treasurer, Mr. John H. Allan, presented a very satisfactory report and balance sheet. Office bearers were elected, and the following competitions arranged:—Special spring competition over Gorebridge on April 9; Stewart Medal competition over Musselburgh on May 21; a hole-and-hole foursome; and a single hole-and-hole match. Among the correspondence submitted was a letter from Mr. J. D. W. Stewart acknowledging with thanks the miniature of the medal presented by him to the club.

**Swansea.**—The staff of the Traffic Department held a most successful whist drive and dance at the Hotel Grosvenor on March 18, the number present, including friends, being about 60. During the evening light refreshments were served. The prize winners were—ladies, first, Miss Fry; "consolation," Miss M. Sweeney; gentlemen, first, Mr. Jack Davies; "booby," Mr. Quirk. Messrs. H. C. Thomas and J. C. Meager ably carried out the duties of M.C.'s. The prizes were presented by Miss A. Ellery (Clerk-in-Charge), to whom much praise is due for carrying out the whole of the arrangements so satisfactorily.

**Hull.**—A smoking concert was held at the London Hotel on March 11, and the occasion was taken to wish "good luck" to Messrs. Booth, Lowery and Slingsby, who are leaving the Company's service for Australia. A capital programme was arranged, the artists including a number of the staff, two professionals and a quartette party.

**Sheffield.**—The Sheffield Employees' Social Club held their annual dance and whist drive on Feb. 25 at the Imperial Rooms, Pinstone Street; 183 members and friends were present, and spent a most enjoyable evening.

**Wolverhampton.**—A whist drive was held in the Midland Café on March 18 in connection with the District Recreation Society. There was an attendance of 60, and a very enjoyable evening was spent. The prizes, which were handed to the winners by the District Manager, Mr. Archer W. Smith, were won by Miss G. K. Veale (ladies' first prize) and Miss L. Robinson (second prize); gentlemen's (first) by Mr. A. Collin and (second) by Mr. S. Owen. Messrs. W. S. Kay and T. Reed acted as M.C.'s.



**Blackburn.**—A whist drive was held on March 3 in Booth's Café, Blackburn. Seventeen tables were occupied, and a most enjoyable evening was spent. Much credit is due to Messrs. Abbott, Anderson and Slater for organising the gathering.

**Manchester.**—The first annual dinner of the engineering staff took place at the Merchants' Hotel, Oldham Street, on March 5, the Engineer, Mr. A. Magnall, presiding. Sixty-two sat down to dinner, after which a musical programme was submitted, and a very enjoyable evening spent.

**Eastbourne.**—The annual dinner of the combined Hastings and Eastbourne staffs took place on Feb. 23 at the Clifton Hotel, Eastbourne, a company of about 25 spending a very enjoyable evening under the chairmanship of Mr. E. Armstrong, the Hastings Local Manager. A musical programme was presented by Messrs. Bilton and Thompson, items being contributed by Miss Langridge and Messrs. Cumming, Robinson, Cole, Hickmore, Bilton and Thompson.

**Birmingham.**—On Jan. 25 a dance was held at the Imperial Hotel. The arrangements, which were in the hands of a few members of the staff, were carried out splendidly, and special thanks are due to them for the enjoyable evening spent. Each department was well represented, the Assistant Superintendent, Mr. Scott, accompanied by Mrs. Scott, being amongst those present.

A football match, another of a series of the inter-staff games begun some time ago, took place on March 5, at Yardley, between teams representing the District Office and Inspectors' Department. The weather was delightful and a good number of the staff turned up to watch the contest. The Inspectors were much the heavier side and did a considerable amount of pressing all through the game, but were unable to take much advantage of their opportunities. The score at half-time stood at one goal each. On resuming after the interval the Inspectors were very aggressive, and although they were pressing all the time could only penetrate the stubborn defence of the District Office once. It seemed to be a foregone conclusion that the District Office would be beaten, but a few minutes before the close from a breakaway they drew level amid much excitement, the game ending with two goals each.

**Portsmouth.**—The annual dinner of the district staff was held at the "Wiltshire Lamb." Close on 100 members of the staff sat down and Mr. S. J. Smith, District Manager, was in the chair. On the tables being cleared, a musical programme was carried out. Those contributing were Messrs. Albany, Padget, Pharo, Yates, Welch, Hogan and many others. The instrumental music was provided by the District Office Orchestra, including Mr. H. Albany violin, Mr. Hughes 'cello and Mr. Mason piano. The usual loyal toasts were drunk and the party broke up with "Auld Lang Syne," after a very enjoyable evening.

**Ipswich.**—The second whist drive of the season was held in the small Co-operative Hall on Feb. 19. The committee had the hall beautifully decorated with flowers and evergreens for the occasion. The ladies' committee (as on the last occasion) very successfully took charge of the catering arrangements, and Miss Wilding, Chief Operator, Ipswich, presented the prizes. Miss Blizard, Operator, Needham Market, won the rose bowl given as first ladies' prize, and was the only member of the staff successful in that respect.

**Brighton.**—On March 3 the Brighton staff held their final whist drive and dance of the season at Forfar's Restaurant, Western Road, 50 being present. After the conclusion of the whist drive dancing was indulged in, Mr. P. Prudden acting as M.C., Mr. H. Drury performing the same duties with regard to the whist drive. The prizes were as follows:—Ladies: first, Mrs. Drury; second, Miss Beard; third, Miss Curtis. Gentlemen: first, Mr. P. Hart; second, Mr. F. H. Best; third, Mr. S. H. Eady. Miss Agutter and Miss Webb assisted in the arrangements, and at the close a vote of thanks was passed to these ladies for their services.

**Paisley.**—The second of a series of whist drives was held in Hutton's Restaurant on Feb. 11, when a match was played between Paisley and Greenock, resulting in a win for Greenock by 55. The prizes were presented by Mr. R. Audsley, Local Manager, and consisted of a bottle of perfume and a box of cigarettes. These were won respectively by Miss Rolling and Mr. Jno. A. Swanson.

## NEWS OF THE STAFF.

Mr. J. SINCLAIR TERRAS who was transferred to Birmingham from Reading in August last, has been presented by the members of the staff in the Thames Valley district with an illuminated address, as a mark of their esteem.

Mr. R. S. GROSVENOR, Local Manager, Walsall, has been appointed Local Manager, Coventry.

Mr. W. DALTON, Inspector-in-Charge, Kettering, has been appointed Local Manager, Walsall.

Mr. J. NEWTON LOWE, Local Manager, Coventry, has been appointed Local Manager, Leicester.

Mr. W. GUDGES, Lineman Inspector, Coventry, has been transferred to be Lineman Inspector, Northampton.

Miss ALICE STONE, Traffic Clerk, Portsmouth, has been transferred to the Herts and Beds district as Travelling Supervisor. It will no doubt be remembered that Miss Stone was one of the two operators who obtained 100 per cent. marks for the "M" Course in Mathematics a short time ago. She was presented by the Portsmouth operating staff with a gold bangle set with turquoise and pearls, and a travelling case, and she carried the good wishes of all with her. The presentation was made by Mr. S. J. Smith, District Manager.

Miss ALICE A. CARMICHAEL, Typist, Glasgow, who left the service at the end of February to take up a similar position in Inverness, was presented with several handsome books by her fellow-workers.

Miss CHRISTINA STEVENSON, Operator, Douglas Exchange, Glasgow, was presented with a silver-backed brush and comb, and hat-pin in case, on leaving the service, as a mark of esteem from the Douglas staff.

Miss ANNIE HENRY, Travelling Supervisor, Ayrshire district, has been transferred to Argyle Exchange, Glasgow, for health reasons. Miss M. ANDERSON has been appointed Travelling Supervisor, Ayrshire, *vice* Miss Henry. Miss Henry was presented on leaving with a pendant and umbrella by the Ayrshire staff.

Miss EDITH YOUNG, Operator, Hastings, has resigned her position in the Company's service, and has been presented with a gold brooch by the Hastings staff.

Miss GERTRUDE HEWITT, Operator, Central Exchange, Birmingham, has been transferred to Bournemouth in a similar capacity.

Miss MINNIE GOULD, Operator, Cardiff, has left the Company's service in order to take up a position with a large firm in Cardiff, who have recently had a private branch exchange installed by the Post Office. Prior to her leaving the service she was presented by her colleagues in the Traffic Department with a silver-mounted oak biscuit barrel and an electro-plated jam dish, as a token of respect, and with best wishes for her future.

Mr. F. W. TRAYTE, Storekeeper, Southampton, was presented by the staff with a voltmeter in case, silver match box and a pocket wallet on his resigning the Company's service to take up a position in the motor industry. Mr. Trayte was a capable and popular official, and carries with him the best wishes of the staff for his future career.

Miss IVY THACKARA, Fee Clerk, Southampton, was presented with a silver-mounted umbrella and a handbag on her resignation from the Company's service to take up an appointment at Bournemouth. The presentation was made by Mr. F. W. Richards, the Chief Clerk.

Mr. H. E. BENNETT, Inspector, was transferred from Portsmouth to Bacup on Jan. 20, and was presented by the electrician's staff with a dressing case.

Mr. F. TRAVIS, Faultsman, was transferred from Portsmouth to Boxmoor on Dec. 13 as Linesman Inspector.

Mr. E. W. SMART, District Office Clerk, Gloucester, on his transfer to Cardiff district office, was the recipient of four handsomely bound volumes of poetical works, which were subscribed for by members of the staff as a token of their esteem. Mr. C. Elliott made the presentation on behalf of the staff.

Mr. T. P. STEEL, Inspector, Beverley, has been promoted to the position of Test Clerk, Hull. Before leaving, he was presented by the Inspector-in-Charge on behalf of the staff with a writing-case and collar-box as a token of esteem and good wishes from his late colleagues.

Mr. R. T. EASTERBY, Inspector, Scarborough, has been transferred to Beverley in a like capacity.

Mr. A. G. LOWERY, of the Hull Contract Department, who has been in the Company's service seven years, was presented by the office staff with a kit bag, as a token of their esteem, on his leaving for Australia.

Mr. A. N. WILKINS, one of the Brighton Contract Officers, had the misfortune to be a passenger by the ill-fated express train which met with disaster at Stoot's Nest recently, and although he was not actually injured, the shock was so great that on reaching London he had to go on the sick list, and at the time of preparing these notes had not returned to business, although expected back on the following day. He was travelling in the wrecked part of the train, and was thrown out on to the line and severely shaken.

Inspectors T. BAYS and E. K. WICKS, Birmingham, upon resigning the Company's service to take up missionary work in North-West Canada, were the recipients of shaving outfits, belts, and other gifts from their colleagues in the Electrician's Department. The presentation was made by the Chief Electrician, who, on behalf of himself and the staff, wished them God-speed and every success in their new sphere of life.

## London Traffic Department: Promotions and Transfers.

Miss AMY LARK, Operator, North, has been promoted to be Supervisor, London Wall.

Miss JESSIE MOORE, Supervisor at Bank, has been promoted to be Senior Supervisor-in-Charge, Stratford.

Miss ETHEL SHAKEL, Operator, Hop, has been promoted to be Supervisor, Lee Green.

## MARRIAGES.

Mr. G. DURRANT, District Office Clerk, Exeter, was on the occasion of his marriage with Miss VANSTONE, late Clerk-in-Charge, Torquay, presented by the staff with a piece of furniture. The District Manager, Mr. H. Reid, made the presentation with a few kindly words.

Miss ADA CRISP, Operator at the Southbourne Exchange, was presented by the staff with a salad bowl and a pair of plated vases on the occasion of her approaching marriage. The presentation was made by Mr. E. HARPER, Local Manager.

Miss F. HAMMOND, Leading Cable Hand, Nottingham Factory, was the recipient of a handsome trinket set and pair of vases from the Receiver and Cable Departments on the occasion of her wedding.

Mr. S. G. TREGILLUS, Stores Clerk, Plymouth, who was married on Jan. 29, was presented by Mr. Hooper, District Manager, on behalf of the Plymouth staff, with a set of table cutlery.

For "Obituary," see p. 10.

## DEATH OF MR. KRARUP.

WE regret to announce the death of Mr. C. E. Krarup, a prominent Continental telephone engineer on the staff of the Danish Telegraph Administration. Mr. Krarup was identified with methods of increasing the inductance of telephone cables by lapping the copper conductors with iron wire, and submarine cables of his design were laid between Fehmarn and Lolland and other places in the Baltic. Mr. Krarup read a paper on his method of loading cables before the Budapest International Telegraph Congress, September, 1908.

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## TELEPHONE MEN.

### XLVIII.—ARTHUR MARTIN.

ARTHUR MARTIN was born on May 17, 1858, at Harrington, Cumberland. He is the youngest son of Samuel Martin, shipowner, and in his earliest days was attracted by the harbour and by the shipbuilding yard of Messrs. Williamson & Sons.

In 1866 the family removed to Liverpool, and the subject of this sketch, entering the Alverton House Academy, was awarded the First Boy's Medal at Midsummer, 1872, out of over 80 pupils, and subsequently finished at Wesley College, Sheffield, from which he brought away some of his water-colour paintings, upon which he still looks with pleasure.

After spending some time with Hargrove, Ferguson, & Jackson, shipowners, during which time he got to know so well all the courses to be steered from the Rock Lighthouse at the entrance to the Mersey right away to below the Tuskar Lighthouse at the southern entrance to the Irish Sea, that on many occasions he has taken a turn at the tugboat's steering wheel. He put in nearly two years in the engineering business with his brother, when he had to give way to early hours and late nights so that he might be about at tide time to make a "pier head jump," as it was at that time a case of first come first served in the matter of securing the repairing work on tramp steamers.

On his introduction to Mr. Heywood Claxton, by Alderman J. B. Morgan's partner, Mr. Martin obtained an appointment in the Lancashire Telephonic Exchange. Being convinced that this young venture was destined to grow into a very big concern the offer was accepted, and Mr. Martin served under Mr. Claxton from April 7, 1881, to Dec. 31, 1899—for the first twelve years as Chief Clerk with the exception of a short period at the outset when he was dealing with an entirely new system of bookkeeping introduced by Mr. Pilling, of Manchester, the Company's accountant. The

remaining seven years were spent as District Manager at Liverpool, which then included the Wirral peninsula, subsequently made into a separate district. This period covers the days when not only had every nerve to be strained to place on solid foundations what was

to become a huge structure, and when like Ishmael's son the Company had practically every man's hand against it in the matter of wayleaves, but there was the determined onslaught made by the Mutual Telephone Company of Manchester. Mr. Martin being one of the best known men in Liverpool and having numerous friends in the Newsroom, Stock and Cotton Exchanges, and Corn and Fruit Markets (as well of course as in shipping and engineering circles), he was in and out of these various places during the day for several weeks until the attack was repulsed, and he thinks he is entitled to look back with some satisfaction to the part he took in the successful defence. On the outbreak of the South African War, when it was a matter of great importance to the whole empire that men and stores should be hurried to the front with the utmost despatch, Mr. Martin suggested to Mr. R. P. Houston, M.P., that he should have an instrument installed on his S.S. *Hyades*, and the latter connected with the Central Exchange. With his characteristic quickness in grasping possibilities Mr. Houston gave the order, and, also with his characteristic idea of having orders executed almost before they are given, Mr. Houston wanted the communication established by four o'clock (it was then noon). Of course this was impossible the steamer being two and a half

miles from the exchange, but Mr. Martin spoke through from the cabin of the *Hyades* before midnight to Mr. Houston's house, much to the surprise and delight of the latter. How it was done, says Mr. Martin, nobody knew except that splendid engineer "Tommy" Rowe





and his capable gangs. All Mr. Houston's and the bulk of the other transports which sailed from Liverpool were subsequently connected with the exchange system, and Mr. Houston stated at a large dinner at the Adelphi Hotel, where Mr. Martin was one of his principal guests, that the installation of the telephone on transports had enabled them to get the steamers to sea long before they would otherwise have been able to do. Some years previous to this Mr. Martin secured the order for installing a telephonic exchange on the Prince of Monaco's new yacht, which was fitted with such a splendid equipment of hydrographic apparatus by the builders Laird Bros., of Birkenhead. The mention of the latter town calls to mind the fact that Mr. Martin was one of the first men to walk under the Mersey from Liverpool to Birkenhead immediately after the completion of the "drainage heading" of the Mersey Tunnel.

During the time Mr. Martin was District Manager he never lost an opportunity of personally interviewing a subscriber or wayleave grantor, and, by his genial manner, nearly always succeeded where any trouble arose in smoothing matters over. His tact and his courteous way of treating people are still remembered, not only by those who were well acquainted with him but also by many whom he knew simply in connection with telephone business.

The same may be said of his manner with the Company's staff; he always met them in a friendly way, irrespective of their position, having a kind word for each.

After spending nineteen strenuous years in Liverpool Mr. Martin was appointed Assistant Superintendent of the Northern Province, on Jan. 1, 1900, where he is still situated.

Mr. Martin was for over twelve years cantoris bass in the Parish Church of St. Hilary Wallasey, Cheshire, and an honorary member of the Liverpool Cathedral Choir—served eight years in the 1st Cheshire Rifle Volunteers known as the "Robin Redbreasts," was for five years captain of the Egremont Cricket Club where he went by the sobriquet of "The Steady" on account of his stubborn defence in keeping his end up, and bowled at a great pace with much success year after year. He was also very fond of rowing.

Mr. Martin now spends most of his spare time in fine weather either in the country or in the garden in which he takes a great interest—and when indoors enjoys many hours at the piano.

## AWARDS FOR INVENTIONS, SUGGESTIONS, ETC.

The following awards have lately been made by the Company on the recommendation of the education committee for inventions and suggestions:—

	£	s	d.
T. Pettigrew, Glasgow, improvements to gas bolt heater stands ..	2	0	0
J. W. Harvey, London, stand for Angelini transmitters ..	2	0	0
W. K. Harding, Head Office, use of coloured paper for printing curves ..	2	0	0
J. Clappeson, Hull, stop valve for air testing ..	2	0	0
E. S. Byng, London, stiffening stay for D.C. brackets ..	2	0	0
H. J. Mobbs, Head Office, improvements to photograph printing machine ..	2	0	0
G. H. Bryant, London, metal pilot spacers for use with record cards ..	2	0	0
C. Campbell, Manchester, alteration to Account Form No. 1,249 ..	2	0	0
J. C. Fuller, London, grant for obtaining bronze medal ..	3	0	0

### GRANTS TO LOCAL TELEPHONE SOCIETIES.

Swansea Telephone Society ..	4	17	0
Swansea Operators' Telephone Society ..	4	15	0
Glasgow Telephone Society ..	4	10	0
Isle of Man Telephone Society ..	4	10	0
Coventry Telephone Society ..	4	10	0
Exeter Telephone Society (1908-9) ..	5	0	0
Stirling Telephone Society ..	3	14	0
Glasgow Operators' Telephone Society ..	5	0	0
Plymouth Telephone Society ..	5	0	0
Torquay Telephone Society ..	4	8	0
Portsmouth Telephone Society ..	4	8	0
Bournemouth Telephone Society ..	4	19	0
Manchester Telephone Society ..	3	17	0
Bristol Telephone Society ..	4	18	0
Bristol Operators' Telephone Society ..	5	0	0

## SERVICE INSTRUCTIONS AND DISCRETION.

By EUSTACE HARE.

(Concluded from page 3.)

Would any man expect or desire to be judged solely on his adherence to the letter of instructions? If so, he is content to be a machine, and every machine depreciates with use or rusts in idleness.

A little expansion of thought is only necessary to see that every branch of work in the telephone service calls for the exercise of personal discretion and originality, forced or involuntary. The instrument fitter must consult the wishes of the subscriber as to the position of the apparatus, but to keep silence when experience tells him the choice is eminently unsuitable, is to court future trouble and expense.

The operator has a definite formula of words to be employed for various occasions, but it would be unwise to make these formulæ so rigid that under no circumstances, in no exchange, irrespective of size and time and place, are they to be varied or added to. There is involuntary discretion in the very phrasing of the standard terms, and it is not easy always to discover the exact boundary line between the tone of business and the tone of curtness. An inexperienced subscriber might even so far deceive himself as to fancy he detected a note of sweetness which was merely intended for ordinary politeness. The happy medium is the hall-mark of an accomplished operator.

There is a patriarchal instruction, and a very necessary one, that no work must be done without a works order; but one can scarcely conceive any engineer, foreman or wireman abstaining from taking steps to avert or repair an accident by the most unofficial or unorthodox means that may occur to him. It is possible, however, to imagine a man so imbued with the letter of the law that on being sent on an expensive journey on specific work, refrains from killing two birds with one stone because he has not been specially authorised to slay more than one. And yet it is this very discretion in economy which helps to make or mar the financial success of private enterprise.

I now turn to a point touching the civil laws which, I think you will agree on consideration, is somewhat remarkable. In spite of the legislative mill which is always grinding and which grinds pretty small in spite of the prodigious output in the course of history, has it ever occurred to you what an infinitesimal part of the whole population of this country ever finds itself brought, not merely into conflict with the law, but consciously within its purview! Does not this prove how very little these laws worry us; how very lightly they sit on our minds and our consciences? Excluding the natural laws, offences against which we and all right-minded persons shrink from instinctively, how many, if any, laws of the land apply equally to every individual in this room? Some of us have to pay income tax, and those of us who desire to keep a dog must pay for the privilege; but not one of us is, for example, exposed to the temptation of giving short weight, nor runs the risk of punishment for entertaining guests during prohibited hours. Probably not one of us knows by what laws he or she is individually surrounded, nor what are unconsciously obeyed or broken.

It is exactly the same with our Service Instructions. Consider the ramifications of the work, the numerous staff branches with their sub-divisions, the varying conditions under which they carry out their duties; eliminate such natural rules as punctuality, honesty, discipline, devotion to service and so forth, which apply equally throughout—not only to our business, but to every business under the sun, if it is to progress—and then let each one of us seek for himself or herself those hide-bound and tape-bound instructions which it has been suggested discourage our intentions and cramp our possibilities! I venture to say there will be difficulty in finding one.

But if one be found, the finder has not only his remedy but his reward. There is not a single official of the Company among those responsible for the issue of Service Instructions who deems himself infallible in his productions, and who is not only ready to consider creative or amending suggestions, but thankful to get them. There

is not a single idea or proposal for improvement that fails to get a patient hearing or is not carefully weighed before a decision is given, or which in proportion to its value in the wisdom of the education committee fails to obtain its reward.

It may be that in some quarters there is an impression that there exists a department whose special function it is to keep a perpetual look-out for gaps in the instruction hedge which surrounds our field of action; if so, the idea has no foundation in fact. I have had considerable experience in drafting and dealing with instructions, and I can tell you this, that so far as my particular sphere is concerned, the unwritten axiom has always been not to issue or alter a service instruction without absolute necessity—to leave a free hand wherever it can be left with safety. Personally, every printed instruction that it has been my lot to father, I have looked upon not so much with paternal pride as in the light of a thankless child that at any moment may display the serpent's tooth.

For in an instruction first and foremost there are the facts, then the marshalling and dovetailing of facts, their condensation, the avoidance of the Scylla of discursiveness and the Charybdis of incompleteness, the fear of misunderstood phrases, the correction of proofs, the reference to other departments into whose domain one may necessarily set foot, and then the launching forth. Finally, expectant criticisms, when, like a fugitive from justice who having closed fifty doors of detection finds himself suddenly confronted with a gaping fifty-first, to-morrow's post may bring to light a simple but obvious error or omission demanding a humiliating correction or supplement.

Another side of the picture reveals instructions misread—possibly, on occasions, not forgetful of Nelson's blind eye—of which I can give you a concrete example. There exists a certain return which shows monthly the result of new orders obtained, etc.; but it was recently discovered that in one instance the return had, from its inception, been a record not of orders obtained, but of orders completed.

With this birds-eye view, can you not imagine that the inclination is to approach the issue of new instructions with reluctance rather than with alacrity?

But these objections to a too-ready rushing into departmental instructions are mere incidents and accidents to be reckoned with and overcome, and must not be construed into a shirking of or a desire to shift responsibility. There are other and far weightier reasons for care in the making of rules and in the foresight of their results.

There are three great underlying and pervading characteristics to be found in all laws and to be held in remembrance of all legislators the world over, and they are these: permanence, uniformity and universality. Sufficient, I think, to cause one to pause, lest undue haste spells the letting loose of an error.

For a business concern we, the staff of the Company, form a great body—a business community—and before making a single addition to our existing code of instructions, it is essential to decide whether the circumstances under which it is proposed to make it are likely to alter—whether it affects only a particular branch of the business or particular districts, or whether a common rule is to be established for general observance. Should it be found that the case to be met is of a temporary nature or affects a partial area only, something less formidable—such as a circular letter to cover the passing incident—than a general printed instruction will suffice.

To treat Service Instructions in a lighter way than this, to overlook the question of permanence would be to invite chaos and to produce waste paper, for every month would bring forth its bewildering crop of cancellations, amendments or supplements, involving continually new editions of whole sections, so that a harried and irritated staff would never know how far it was up to date in its methods.

Permanence therefore acts as a wholesome restraint on hasty, half-baked legislation; for it is no small matter to remember that an order issued to-night will have reached a thousand brains to-morrow morning and that without care and forethought it might be imperative to get it out of those brains after it had become firmly established there, in a month or two. But if you are prepared to acknowledge and accept some reason and prudence in those who issue our instructions, you should, with consistency receive them in the same spirit and treat them accordingly. Perhaps they merely

confirm your existing method, your pre-conceived notions; so much the better. And if not, give the author credit for a good and broad motive, and still remaining unconvinced, submit your matured alternative.

But do not forget uniformity, on which there is much to be said.

It would be of no use for me to attempt to disprove that, taken alone, uniformity is opposed to individuality; I admit the fact but at the same time dismiss it with the proposition that individuality outsteps uniformity. Uniformity soon exhausts itself while the phases and possibilities of individuality are practically limitless.

I have already referred to the even step of a regiment of soldiers. Now, to the casual observer this regularity may seem merely a question of discipline, or it may be the rhythm of many marching as one that appeals to the sense of order, in much the same way as does the scarlet coat; and the regularity of tread and clothing proclaims to him the soldier. But to the soldier himself the red coat and the discipline, unconsciously, mean much more; they mean unity of mind and of action in the field, they remind him of what is expected of him; and he rightly expects that every man clothed and trained as he is will act equally, side by side, at the word of command.

But the soldier also knows that the red coat cannot of itself turn a constitutional coward into a brave man and that no discipline will regulate his pulse or control his feelings. Nor will the soldier be likely to win distinction by always waiting for instructions.

The word of command given, the soldier is his own master. He may urge his horse or keep it in, as he thinks fit; he may coolly mark his man before he fires or he may leave each bullet to find its billet; he may prefer surrender to death. These are matters, not of uniformity but of judgment, discretion, initiative and temperament. At the same time, if he betakes himself to either extremes, he will not, probably escape the eye of his superior officer.

Our position as a commercial concern does not commonly lead us into ways of heroism or the reverse, but in point of direction and discretion my military metaphor holds good, and I need not labour the moral. In further regard to uniformity I have a few words to say on the technical side of our work as distinct from the financial; although you must not assume that engineering has no connection with finance. It has much, but the relationship is not part of my story.

Of engineering and electricity and their intricacies I know nothing, but in the little I have learnt of things in general I have gathered this, that the complete knowledge of all physical facts is only achieved by searching their theories. You may mechanically build a wall or a route of poles, anyone can see them when built, but without the study of their theory you do not know them. To the men who set up a pole, to the onlooker who sees them do it, it may seem all sufficient that the security of the pole is established by its being sunk a reasonable depth into the earth; and that the deeper it is sunk the greater is its stability. Assume for the moment that the officer in charge of the work knows nothing of its scientific principles. How does he gauge the required depth? By sheer experience? If so, how many years, how many poles of varying sizes has it cost the Company for him to ascertain to a nicety how many inches of each pole must be hidden in the earth? If he plants too deeply he is wasting money both in material and labour; if the depth is too shallow, he runs the risk of disaster.

No; he follows an instruction, a table. Not arrived at by tedious and doubtful experiments, but by knowledge of solid facts founded on proved theories. And the setting forth of these facts by master hands facilitates his labours and accelerates the work of the Company. Again, be it remarked, there is no desire here to restrain individuality, but the primary object is to promote uniformly good and safe work, the welfare of the business coming before all things.

It is quite easy to imagine that when the telephone was first introduced to this district of Gloucester the whole staff might have consisted of a manager; a foreman, with one or two wiremen and labourers: a fitter and instrument inspector, one operator and a clerk. That is to say one person may have had the entire work of a department on his or her shoulders. In such circumstances it is evident that the issue of printed instructions would be wasteful, expensive and out of place—for each person, assuming his competence, would be, practically, a law unto himself, and any doubts or difficulties would be referred to the manager, who, being responsible



for the whole, would deal with them as he thought fit. In this primitive state uniformity would find no place; it would not exist.

But as the business grows in size and importance the conditions change; and to cope with them additional staff has to be sought and has to be taught. In time also the pupil becomes as wise or even wiser than his master, until a point is reached when it is necessary to decide upon the merits of new methods and superseding innovations. It is here that the old order changeth, and, supposing Gloucester to be the only telephoned town in the kingdom, it would fall upon the manager to arbitrate and to lay down definite rules to be generally followed; and the instant that you begin to create rules uniformity necessarily and imperatively follows.

One of the main objects of laws and instructions therefore is to promote uniformity, and the question of uniformity arises only when the number of persons concerned becomes too great to allow of individual counsel.

Gloucester is, however, but a unit, and not an isolated unit. It might be better described as a link in a vast chain, every link of equal importance and of the same pattern. Here we are brought to universality, a big word, a word for big minds, achievable only by the comprehensive mind, and by those whose work lies in the forging of the entire chain.

Unfortunately, in every progressive undertaking absolute universality of system and plant is unattainable; the perfect thing, if it ever comes at all, comes by evolution. We know this and regret it, and regretting it we must surely acknowledge that the next best thing is to get as near to it as possible. We can at least pull together, and without undue splashing, even if our boat is not of the most modern and approved type.

No one would deny that universality of system is good for the public—that the man from Glasgow or even from New York should feel at home when using a telephone in Gloucester. Nor is it difficult to see that the work of the management would be very much easier if every new exchange were but a replica of the last. The facts speak for themselves and need no demonstration, but I want to show in what way the staff benefits by universal practice and methods.

Suppose sufficient latitude were allowed to every engineer to use the class of material he thought best for his work with unfettered discretion in the manner of shaping it for the needs of the service; or that every chief clerk were given scope to alter the methods of bookkeeping when in his opinion it was advantageous to do so. In skilful hands, it might be that, in themselves, the results were perfectly satisfactory. But what of the men under those chiefs who have been taught otherwise, and who have to unlearn their own methods; what of the staff at Head Office who have to gather up the threads of a hundred centres and show results as a whole? And, above all, what of the unfortunate individual who, promoted from one district to another, finds himself a foreigner in a strange land, with the sequel that his subordinates find themselves choking with the dust raised by a new broom!

Service Instructions are expressly issued to prevent this. They bind us together; they teach us to sink our individualities where the common good is concerned; as a book of reference they help us when we are at a loss; they tell us, indirectly, what is in the mind of the management and, directly, that every new idea worthy of putting into practice, and from whatsoever quarter it emanates, is percolating through the entire system at one and the same time.

Wherein, then, lies our discretion, the exercise of our individual judgment and ingenuity? In the intelligent interpretation not merely of the letter, but also of the spirit of the laws laid down by our acknowledged governing body. If we do this, we are doing much; if, having accomplished this, we evolve an improvement in any particular direction, we are doing better, and our efforts do not escape recognition. But on our side we must recognise that laws are not made for the individual but for the community, and that the man of genius, the man who rises above the laws, is a rarity.

There are probably no two men whose views of their work and of the service generally are exactly alike, but we can, I think, divide the staff broadly into three orders: First, those of the conservative order—men of punctual habits both in the matter of arrival and departure, painstaking in the work allotted to them, men with hobbies, disliking change, and merely tolerant of any Service Instructions which spell innovation. But they master them loyally,

and resume the placid tenour of their way. Partly on account of their innate conservatism and partly from the fact that probably their interest in amateur pursuits is equal to or outweighs their official duties, the question of discretion or ingenuity in methods does not greatly appeal to them. The book of Service Instructions is their anchor sheet.

Then there is the order of the querulous—happily, I believe, a small one—men prone to opine that their merits do not always receive adequate recognition—possibly men of brilliant parts but of narrow vision, fretful under criticism, whose convictions are founded on inspiration or prejudice, rather than on the surer basis of tedious reasoning and study. These are the men to whom cold and uniform instructions are irksome and irritating, and to whom discretion and initiative mean an unfettered stage of operation, which is of course an impossibility where uniformity is paramount.

Lastly, there are those of the order enthusiastic, ever extending and not confined to any particular branch of the staff, whose chief aim is to advance in the knowledge of their work and thus help to vivify and advance the work itself. Service Instructions to men and women of this type produce neither fretfulness nor a slavish machine-like observance. They search for motives in order to enter into the spirit of the instruction and thus are able to carry out the letter intelligently. Discretion, ingenuity, originality exist equally for all of us, ready to be applied to the methods which uniformity, economy and permanence compel the administration to lay down. It is not necessary that these qualities should be freed from restraint to develop themselves, and, instructions or no instructions, no man need despair of stamping his work with his individuality, be it good or bad.

There is perhaps no man who has to rely on his individuality more than the actor, but his art lies not in improving on the words or the plots of Shakespeare, but in identifying himself with and conveying to his audience an accurate and living representation of Shakespeare's creations. Because, the mere copy and the closest imitation of the greatest facts or ideas, without appreciation of their true and inner meaning, will not carry us many stages along the road to success.

## EXPERIMENTS ON DRAWING IN UNDERGROUND CABLE.

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THIS paper is based on the results of an investigation of the mechanical working of underground cables. The investigation covers most of the mechanical stresses set up in an underground cable, and terminates with the consideration of the stresses for the revision of the thickness and the choice of materials of the sheaths.

The co-efficients of friction between cable sheaths and various classes of ducts have been determined, and it is noticeable that the effect of duct lubricant varies with different ducts. Thus in the case of cast-iron pipes the co-efficient of friction is reduced to about 55 per cent. of its value by the use of lubricant. Similarly the co-efficient for a lubricated cement pipe is reduced to about 68 per cent. its value by the use of lubricant; but in the case of glazed earthenware ducts the co-efficient is only reduced to about 80 per cent. of its unlubricated value.

The force required to draw a cable into a duct, however, is not altogether accounted for by the weight of the cable and the co-efficient of friction only. The diameter of the cable affects the progress of the cable, inasmuch as a cable of a large diameter will retain the curvature, imparted to it while on the drum, more rigidly than a small cable. The effect of this and other curvature is to cause the cable to touch on the top of the inside of the pipe, and thus cause additional resistance to the motion of the cable.

A series of tests have, therefore, been carried out to measure the force required to draw a cable into a pipe, and to see how it varies with the length, diameter, weight, etc., of the cable.

The first problem was that of devising a means of measuring the tension in a running rope while drawing a cable into a duct; the tension in the rope being a measure of the force which is applied to the cable. The most obvious method of doing this is to

insert a spring balance in series with the hauling rope. This method, however, is not always practicable as it entails placing the winch at some distance from the manhole in order that the balance may be constantly in view during the passage of the cable through the duct.

The method chiefly employed for finding the tension in the hauling rope is shown in Fig. 1 embodying the principle of a transmission dynamometer.

The rope on its way from the duct to the winch is made to pass round the pulleys A, B and C. The pulleys A and B are fixed relatively to the earth and the pulley C is suspended in series with a spring balance from some support above, and it is easily seen that the reading of the balance is dependent upon the tension in the rope.

Thus suppose the pulleys be set so that the angle made by the rope passing over the pulley C is  $120^\circ$ , then the force acting down-

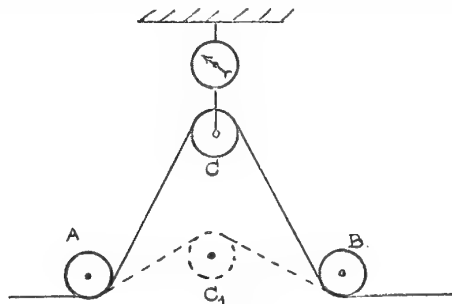


FIG. 1.

wards on C, which is the reading of the balance, is equal to the tension in the rope.

The chief feature of this arrangement is its flexibility of range of measurement, for it will be seen that with a balance of given limits, say, 2,000 lbs., it is possible to measure a rope tension of almost anything by setting the pulley C in some lower position, so that the rope tension is just double or three times the reading of the balance.

It is not advisable, however, to have the ratio of rope tension to balance reading too great, greater than, say, 1.5, as a slight error in measuring the position of C relative to A and B would then seriously alter the results.

A dynamometer on this principle was constructed in which a spring balance reading up to 200 lbs. was set to measure a rope tension of 2,000 lbs., so that the top of the pulley C was only slightly above the bottoms of the pulleys A and B. The

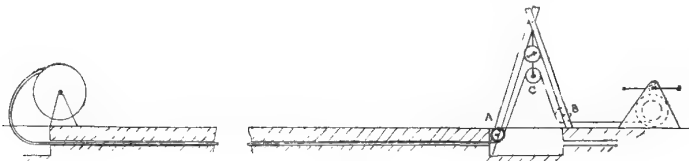


FIG. 2.

machine was not a success, owing to the stretching of the rope and the inability of the rope to immediately regain its normal diameter on reducing the tension.

A typical general arrangement as actually used is shown in Fig. 2. On the left-hand side is seen the cable drum containing the cable to be experimented with. The rope is shown threaded through the duct and round the three pulleys A, B and C to the winch. In this case a spring balance reading up to 2,000 lbs. was used, and the pulleys forming the transmission dynamometer fixed into a portable set of "shear legs." Owing to the more acute angle made by the rope over the pulley C the stretching of the rope does not affect the results appreciably.

In one case it was estimated that with the pulley C (Fig. 2) set as low as was consistent with accuracy, the downward force on C would be greater than the balance was designed to read, and was likely therefore to damage the balance.

The method of overcoming this difficulty was to modify the suspension of the balance as shown in Fig. 3. This arrangement consists of the pulley C for the hauling rope and two other pulleys with an endless rope passing round them as shown. In this case the downward force on C is equally sustained by the two ropes  $r_1$  and  $r_2$  so that the reading of the balance is just one-half of the total downward force on C thus enabling the balance to be used with safety.

The investigation on tension was terminated by the creation of a formula, which enables the tension to be calculated in a cable of any length, weight and diameter when drawn into various classes of 3-inch pipes, lubricated or not lubricated.

One of the next questions was to ascertain what assistance was given to the tensile strength of the sheath by the friction between the core and the sheath. This was found to vary with different cables and manufacturers, and experiment showed that in some cases it is necessary to elongate abnormally the sheath before the friction between these two parts becomes of any importance. Under the circumstances it has been decided to neglect this assistance as a working quantity and to include it in the tension factor of safety of the sheath.

The choice of material lay between pure lead and an alloy of 3 per cent. tin and 97 per cent. lead, and to make two sheaths of the same tensile strength it has been conclusively shown that it is

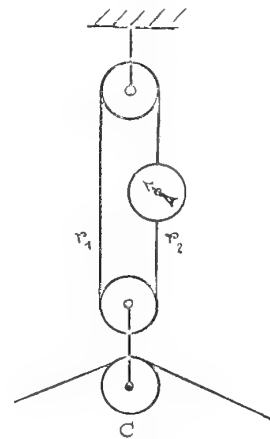


FIG. 3.

cheaper to use the 3 per cent. tin lead alloy, so long as the price of tin does not exceed a certain number of times the price of lead—a ratio which has not yet been reached.

One of the points generally raised against the use of the alloy is that the tensile strength cannot be relied upon owing to the difficulty in mixing the composite metals of the alloy properly.

In support of the use of the alloy it may be mentioned that all the tensile strength tests on cable sheaths were carried out in duplicate, and it was found that the average variation in the tensile strengths of two similar specimens of the same material was 2.1 per cent. in the case of the alloy and 2.5 per cent. in the case of the lead.

This shows conclusively that the mixture of the alloy does not vary from inch to inch in a specimen.

A comparison of the breaking stress of different-sized specimens shows a small uniform increase in the breaking stress as the cross-sectional area of the specimen decreases. This of course has nothing to do with the former point.

There are many other respects in which the two have been compared, pliability, hardness, ability to resist chemical corrosion, internal air pressure, etc.

It was, of course, a difficult matter to compare the advantage of one material over the other in one respect, with the advantage of the other over the one in some other respect. It was finally decided, having due regard to all these properties, that to construct a sheath for the requirements under consideration the alloy was the better material to employ.



The minimum tension factor of safety being decided on, the following table has been drawn up, indicating what length of 10-lb. conductor cable can be drawn into an otherwise empty 3-inch lubricated C.I. pipe on a straight route:—

Number of pairs.	Length which may be drawn into cast iron ducts.				
	Yards.				
1					
2					
3					
5					
8					
10	...	...	...	...	350
15					
20					
25					
50					
75					
100	...	...	...	...	330
150	...	...	...	...	300
200	...	...	...	...	270
250	...	...	...	...	270
300	...	...	...	...	270
400	...	...	...	...	250
500	...	...	...	...	220
600	...	...	...	...	200

One suggestion for economy which was put forward and abandoned in consequence of manufacturing difficulties, is worth mentioning.

It will be understood that the tension in the sheath of a cable when being dragged through a pipe, is a maximum at its head and diminishes to zero at the tail of the cable. From the consideration of tension only, the thickness of the sheath could be made, therefore, to diminish to zero at the tail of the cable.



USING THE SPRING BALANCE IN SERIES WITH THE HAULING ROPE.

The suggested sheath consisted of a tapered sheath being thick enough at the thinnest point (the tail) to prevent punctures, etc., from other causes.

This sheath, known as the constant stress sheath, would insist on certain restrictions with regard to working. For example, the cable grip would always have to be fastened to the thick sheath end of the cable whether drawing in or out. Nevertheless, such a sheath would well be worth considering on the score of economy, if it could be made inexpensively.

#### FOOTBALL.—THE CLAY CHALLENGE CUP.

The final tie took place at Tottenham on April 9 between Head Office and London Southern District. After leading by three to nil at half-time, Head Office ultimately won the cup by four goals to two.

## OPERATING AS A CAREER.

By FLORENCE J. MINTER, *Metropolitan Examining Matron.*

(Concluded from page 10.)

I have heard some people say that references are of no use, and certainly it is only in one or two cases that we have received adverse letters of recommendation. People would naturally select as referees those who would have something good to say of them. Judging by the references, there never was such a staff of good honest, clever, intelligent and well-behaved people as those of the National Telephone traffic staff. Some people have strange ideas as to what constitutes suitable referees, and we receive the names of omnibus and tram drivers, policemen, postmen, waiters and cooks—honest, no doubt, but scarcely what the Company mean by "responsible person."

The quaintest letter of this nature I have received is the following:—"It affords Miss ——— much pleasure to sign herself as a reference to the character of Lillian ———. She readily expresses her approval of Miss ——— to any post she may obtain, and gladly sums up her experience of her whole life (Miss ——— has known her since babhood) in such hearty terms."

It sounds like the polite letter writer slightly transposed.

I do not know whether I am more sorry for the beginner, when she commences her career in the operating school, and is faced by the mass of seemingly intricate matter she has mentally to assimilate within four weeks, or when she makes her first step into an exchange, and has to bring into actual practice all she has been learning. I am afraid some of our senior staff, when they come to the school and see the apparatus and the plans and diagrams provided, and have an opportunity of hearing the patient manner in which the supervisors endeavour to instil their knowledge into the learners, are rather apt to expect too much of the operator on probation in the exchange, because the learner has so much provided which was not known in earlier days. They forget, however, that what they know themselves has been taken in gradually as the years have sped, and this and that rule or that method of working has come into force; but the learner of to-day has to take in the theory and practice of modern telephone operating and a mass of regulations and general knowledge rendered the more difficult because of multiplicity of the present rules, instead of the simplicity of the past, and I doubt very much whether these seniors would do very much better, if as well, as some of the juniors to-day. I must confess to a very soft spot in my heart for the newcomers.

The school life is happy enough, and I am sure hundreds look back to that period which contained happy days as well as hard days, and many lasting friendships are made at that time.

The individuality of the operators must always be reckoned with throughout their service, and certainly it is nowhere more apparent than in the operating school.

There is the brilliant girl to whom learning is child's play, and who seems to grasp the idea before one has the opportunity of showing her; the dense girl who is hopelessly so and the dense girl on whose intellect the light suddenly breaks in, and who afterwards makes rapid progress; the quick girl who never becomes careful and the slow girl who would not hurry in a fire, and the plodder who becomes the reliable operator; the bad-tempered girl who resents correction, and the girl who thinks she knows and equally resents being told; the girl with no sense of humour, and the girl who breaks the accustomed quiet of the school by an irrepressible laugh at the thought of the man in the call office who, possessed of a bent penny, cannot get his money in.

In the latter case I am, of course, referring to the monitors, one of whose duties it is to pretend to be subscribers, and are in turn all species of that terrible person. They carry out these duties so successfully that one girl was reduced to tears by the pretended cross subscriber, although she said afterwards, through her sobs, that she would not have minded if it had really been a man, but she could not bear to think the monitor was angry.

Possibly in the smaller schools in the provinces there is more opportunity for individual training; but although the different personalities must come in, they cannot be dealt with and moulded

singly in a Metropolitan school, nor can, in either case, indefinite time be given to a girl making unsatisfactory progress until she has gained what she lacks in energy or smartness, or lost those attributes which form stumbling blocks to her success; and although from time to time we have to dispense with such learners' services, I do not think we must always credit them as failures, or ourselves with too little insight into their characters. It is not every girl who is suitable for telephone operating.

So far I am afraid I have dealt at too great length with the operator in embryo, and at the very outset of her career, but as so much of a girl's success in an exchange must depend upon her personality, training and general suitability for the work, character study must come largely into the selection, and then, having learnt her work, and being on the staff, the "career," so far as each day's work is concerned, seems very much the same, as the years slip quickly by, till she becomes a senior operator and eligible for promotion.

Yet how important are those years between the date "made operator" and the date when the exchange manager recommends for promotion, or, on the other hand, has to say, though she may have been for some time at her maximum salary, that he "cannot recommend." Far more important, just because of those two possibilities, than I fancy many of the operators realise. Just as in everyday life a person is credited with a character for this or that, so surely do operators gain their character and build up reputations in telephone exchanges quite apart from the "service card," with its copious entries or its clean sheets, for it is but a poor exchange manager or clerk-in-charge who does not know what to expect from each individual on their staff.

With regard to the service card, the girl with a record of constant small irregularities is, to my mind, not nearly so excusable as the girl with one or two big faults which her clerk-in-charge may often be able to account for from her knowledge of the special circumstances, private or otherwise—being out of health or specially tried. I am, of course, not speaking of those who commit great breaches of the regulations, often through want of sense of honour, and who destroy the confidence of their superior officers and bring discredit on their colleagues. But the fact remains that the girl who is constantly going wrong in little points, but points all important to good service, cannot expect promotion to a more responsible position, any more than the operator with big entries against her. Both show lack of appreciation of discipline, or the good of the service, and a want of *esprit de corps*, and who can bring discipline to bear on others if they have not themselves first learned to be ruled and directed?

None of the Company's rules are impossible to keep, and all are framed to render that, so dear to everyone who has the best interests of the Company at heart, an efficient service.

Because the work of a telephone operator is very much the same year in and year out, there may be with many a tendency to get too much into a groove, and the natural consequence is that, when the opportunity for promotion comes, an operator may be excellent in the actual operating routine but sadly lacking in initiative and common knowledge, and may never have troubled to think why she does this or that, or *why* this or that is required in connection with her work.

To me it is astonishing how little some people know or trouble to learn of matters outside the immediate sphere of their work, and with these self-created limitations such people become, unconsciously, merely machines, and certainly mechanical in thought. This becomes very apparent in the qualifying tests for clerkships or supervisors' positions, where an actual inability is shown to express their ideas or views on paper, and it is obvious how little they have used their powers of observation.

These same papers also show how little some people keep up their education. The essays are meagre; answers to questions are ungrammatical, sometimes badly spelt: the articles and subordinate words are omitted, and few candidates can compose a business letter.

I would preach and ever preach to the operator throughout her career—ambition. Not the "vaulting ambition which overleaps itself," but the variety that is mother of the healthy efforts at self-improvement and the attempt to fit oneself for something higher, with the feeling that, though but mortal, if not able to "command success," to do better, "deserve it."

An operator should enter the exchange with the fixed determination not to remain an operator all her life, if there are more lucrative and responsible positions in the service to attain. We must all pass through the mill, and no permanent success is obtained without hard work, and certainly none is so sweet as that which is the outcome of sustained effort.

Many manage to squeeze through the entrance examination, and having obtained a position, and qualified as an operator, think that nothing more is required of them in life but to satisfy a certain number of subscribers daily, and if not too many entries appear against them on their record, they will obtain their periodical increases in salary. The examination may have discovered a very weak subject, although the total marks obtained constituted a "pass," and it may have been suggested, as I generally suggest to such girls, that they would be wise to recognise their weakness, and endeavour to overcome it. But there is a great temptation to procrastinate, and a real effort is required to devote regularly even a few hours weekly to self-education and improvement. But the effort pays in the long run.

Supposing an operator is asked by her exchange manager to undertake some special duty to assist temporarily with the clerical work, or to take a special record—do not think her failure or success, as shown by the amount of education she appears to possess, is passed unnoticed. There may be, later on, a vacant clerkship in the exchange, with its privileges and responsibilities, and possibly higher pay, for which an operator has always the chance of being specially selected.

And if you mean to be supervisors some day, remember you must be able to do something more than operate to keep the position, if promoted. Believe me, if success comes at all, it will come because it is deserved, and not because merely sought after. Do not be discouraged with the difficulties to be faced. Remember:

"The wise and active conquer difficulties:  
By daring to attempt them. Sloth and folly  
Shiver and shrink at sight of will and hazard;  
And make the impossibility they fear."

To those who do try their very utmost to succeed, and yet fail to rise, and to whom Nature has not given an abundance of those essentials for higher positions which it is impossible to cultivate, I would say, remember that "high failure overleaps the bounds of low successes," or, as George Macdonald puts it, "The failures of some will be found eternities beyond the successes of others."

Your aims, your efforts, your steady conscientiousness, must win the confidence of your exchange manager in you as an operator, and you had better be an excellent operator than a poor supervisor. But still, *aim high*—"Not failure, but low aim is crime."

Endeavours should be made by exchange managers to get every worrying and troublesome subscriber to visit the exchanges, when he would at least be convinced that operators do *not* read novels or do fancy work at the switchboard, or hold long and interesting conversations with their colleagues near at hand on the subject of a new hat. I think there is still a great deal to be done in the shape of educating the public as to what a busy and important official of the Company is the operator who is responsible for their telephone service.

The operator herself must never lose sight of the fact that she is important and responsible. Generally the only acquaintance a subscriber has with the Telephone Company is through the operator who answers his calls, and through the receipt of the annual rental notices. Do not forget that you represent the National Telephone Company to him—be jealous of the reputation you gain for it; uphold the prestige of the firm, and its gigantic staff, of which you are a member. Remember you are individually responsible.

Then again, although you may accuse me of sermonising, I would say that a girl should try to realise, when she enters the service, what she owes to her fellow-workers. It is due to them to do her share to maintain the tone of an exchange staff, and one's influence is so widespread that it may circle and widen for good or bad beyond all our expectations.

Two things should never be lost sight of—Not to make the fatal mistake in thinking your work does not matter; and—Not to look upon your work as a necessary evil. If you do, the effect will



soon be apparent. We should, I suppose, if we had our choice, select a path in life which contained no toil, but Kingsley says:

"Thank God every morning when you get up that you have something to do that day which must be done, whether you like it or not. Being forced to work, and forced to do your best, will breed in you temperance and self-control, diligence and strength of will, cheerfulness and content, and a hundred other virtues the idle will never know."

It is not an easy matter to keep sweet-tempered and cheerful, but it is worth while trying. I think it is the famous Mrs. Wiggs of the *Cabbage Patch* who said:

"When things first got to goin' wrong with me, I says: 'Oh, Lord, whatever comes, keep me from gettin' sour!' Since then I've made it a practice to put all my worries down in the bottom of my heart, then sit on the lid an' smile."

It is a very good practice to follow, but I expect a number of us have to "set" rather heavily on the lid occasionally to keep the worries from creeping out.

I do not know the system for promotion to supervisor's positions existing in provincial towns, but one cannot but appreciate the formidable task in London with a staff of nearly 2,000 girls cut up among 61 exchanges, and with the order of seniority to be taken into consideration.

I think the old idea of being promoted by seniority without taking merit into consideration is entirely exploded among the Metropolitan girls, and they know they must be meritorious and as suitable in character as in work to obtain their increases, and certainly to be promoted.

In London we have found it necessary to keep a separate record of all senior operators, and each six months the fifteen exchange managers present the traffic manager with a list, showing in order of merit all senior operators in their district in receipt of a salary of 19s. a week and over, giving their full remarks on the abilities, character and suitability of each—drawing a line between those recommended and those who cannot be recommended for promotion, and giving reasons for the latter. The traffic manager then considers for promotion during the current six months only those above the line, he, of course, having to work from a complete list compiled in my office from the fifteen other lists on a seniority basis, with the order of merit inserted against each operator.

If the first in order of seniority is first in order of merit in her exchange also, and her address enables her to fill the particular vacancy, she is naturally the first considered; but if not recommended her seniority rightly avails her nothing.

Each supervisor or monitor is promoted for three months on probation, during which time, by the traffic manager's instructions, she is coached in her particular duties, and has so many hours allotted for actual study of operating matters from the various service instructions, and so forth, and if her practical work recommends her, at the end of the probationary period she sits for a qualifying test, and, if she passes, her appointment is confirmed.

It must be understood that this test of efficiency has not been framed for the purpose of making promotion more difficult, but the past has shown the error of appointing to the responsible position of supervisor one who, on the surface, is giving satisfactory practical work, and yet in an emergency, or in course of time, shows but very superficial knowledge of the theory of her work, and but poor acquaintance with the rules.

The test deals entirely with subjects with which, in the ordinary course of her work, she may daily come in contact, and a person of average education, with some ability to express her thoughts on paper, should have no difficulty in passing.

It is a system which I believe I am right in thinking the London traffic manager has satisfied himself as having been amply justified by the results in the exchanges.

I often think of the supervising staff as like the non-commissioned officers, who are considered the backbone of the British Army; but every little nerve and tissue of the gigantic vertebrae required to form the support of exchange work must be strong—strong with a keen sense of responsibility; strong in the knowledge of what to do at the time; strong in the ability to transmit to others her own knowledge; strong in tact; strong in character; and strong in both wish and ability to help her juniors.

I can but deal shortly with the different class of work required

of supervisors who deal with the operators, and the monitors who deal directly with subscribers, one of the latter's principal qualifications being the ability to give the "soft answer that turneth away wrath." The operator who, during her career, has been capable of instilling the confidence into her subscribers that all possible is being done, and every attention is given to his individual service, will go far to make a successful monitor.

It has been suggested more than once that supervisors have more responsibility than monitors, but I am of opinion that each is equally important, although the monitor has perhaps the more trying position. Alertness and an absolute knowledge of rules is essential in both, but the monitor must have the bigger strain on the sweetness of her temper.

Representing the clerk-in-charge, she must give a subscriber the impression that that personage can always be relied on to settle his telephone trouble; but there are many subscribers possibly at the same moment who are clamouring equally, and not always politely, for attention to their particular complaint.

Some monitors give, as the result of a businesslike tone, the impression that there is no time to be wasted; there is not, but the subscriber must be answered pleasantly, and given the impression that all the time of the clerk-in-charge is at his disposal.

A monitor must also be firm, and, knowing she is right, keep to her word, and yet tactfully still "turn away wrath." She must also be accurate in recording complaints, and should be a good writer. In a large exchange "team work" is as essential among monitors as operators. With the excellent modern arrangement of team work, or divisions, one can but regard the supervisors as clerks-in-charge in the making. Each is responsible for the work and training of a certain number of individuals, and on taking up her duties a supervisor learns to look at operating not merely from the standpoint of her own little section, but, with a broader view, to realise the difficulties of maintaining a good service with the ever-varying human parts of the machinery to control and direct.

Hitherto she has had to control herself, and has been directed in the difficult points; now she has to bring into play all the tact of which she is capable suitably to control others, and all her operating knowledge and experience to assist and direct those of whom she is in charge, and for whose work she is responsible.

She has also, during her probationary period, to study and become closely acquainted with traffic subjects, which she has hitherto looked upon more or less in the abstract. To teach others we must have a very accurate knowledge ourselves; but as regards our personal influence, this depends not only on what we know, or even on what we do, but upon what we are.

Furthermore, a supervisor has to cultivate a due sense of her position, and yet avoid that aloofness from her team which is fatal to all feeling of comradeship between different grades of staff. This latter is a more difficult quality to attain when promoted to a higher position in the same exchange—a thing which is very seldom necessary in London, but which, I presume, has to be done in smaller districts.

In this position, no less than any other in an exchange, would I again preach the doctrine of ambition, for there remain still higher heights to climb. The same system of promoting on probation is followed with regard to making senior supervisors in an exchange, or senior supervisors in charge of smaller ones, the latter's classification being dependent on the number of subscribers and their positions, and being, to my mind, much more onerous and responsible, with all the clerical duties to perform, and responsibilities of being in charge, than the senior supervisor in a large exchange, with its clerical work performed by persons specially sanctioned for the purpose, and a clerk-in-charge and often an exchange manager to refer to in a difficulty.

The same system again is applied when the question of an operator's reaching the zenith of her career is being considered, but for so important a position, the test is naturally severe, and a somewhat fierce light must be brought to bear on a person's qualifications for the post. In fact, I approach the subject of that highly important official with the consciousness of my own temerity, but, at the same time, have my own opinion of what constitutes the ideal clerk-in-charge.

Her responsibilities are so manifold that she may materially make or mar an exchange from the service point of view, and

certainly she may affect the well-being and happiness of the army of girls under her rule. If one may use a simile, she is the hub of the wheel, the supervisors are the spokes, and the operators the rim, and the smooth running of the whole is dependent on the stability and excellence of the central portion. She may raise or lower the tone of an exchange; she may influence, for good or bad, the spirit in which its work is carried on. The position demands of its holder high attainments, high ideals, and the ability to distribute her knowledge—to give the benefit of her experience of human nature as well as of the work of operating—to possess such a personality that its influence may result in her own high ideals permeating the exchange rank and file.

Some persons have the gift of extracting, without apparent effort, the very best from others. Some, on the contrary, may urge, expostulate, persuade, and even drive, and the result will not be such a standard of excellence, and may bring about efforts made half-heartedly, begrudgingly, and even from fear of consequences.

The chief part of the day in the workaday world is spent in labour, and it is a sorry day for anybody when one's work becomes mere means to an end, and the scene of one's labours but represents the place in which so much money is gained for so much toil; and I am confident that the exchange, in spite of the monotony of calls, troublesome subscribers, and service tests, can become the place in which genuine *esprit de corps* gives healthy competition, and the happiness that comes in the knowledge of a day's work well done—of one's efforts being appreciated. But it may become a hopeless, horrible, ghastly reverse, to the newcomer especially, who has not become hardened, or developed a hard sort of philosophy as to the world in which an unkind fate has placed her. The clerk-in-charge should be a woman who will greet newcomers in a way which puts them at their ease, and certainly not with the stony British stare which slowly travels in a disconcerting way from feet to head, and which is not confined to the aristocracy of the *Vere de Vere* grade, I am sorry to say.

She should be a woman who, though sensible of the dignity of her position, should always be approachable to her staff, and ready to lend the friendly, sympathetic ear to a difficulty, pleasure or trouble.

I feel I am not exaggerating when I say that the personality of a clerk-in-charge can be responsible for making an exchange like either of the two pictures I have presented.

In reading the biographies of the "Telephone Woman" in the JOURNAL one cannot fail to be struck with the number of excellent disciplinarians the company possess. Discipline is an art, but before complete knowledge of your subject, wide sympathies and zealous attention to duty, its difficulties must vanish, and the small assertions of inferior natures are forced behind.

An enthusiastic love of work and the knowledge of the working of a mind as it struggles towards the light, will accomplish greater things than the most perfect methods or rigorous discipline.

Nature did well when she moulded us in different patterns, and life would be monotonous indeed if we all had the same characteristics and abilities; and although to work smoothly an exchange becomes like a well-oiled machine, the human components will never become wholly machines, and the individuality of the worker must become apparent, and has its own value, and the clerk-in-charge, to be successful, must be able to take into consideration the various personalities of her staff, and use them to the best advantage.

To mention beginners again, a clerk-in-charge should be able to deal tactfully with them, in order that they may feel they have someone to whom to apply in difficulties, and not a person ready to condemn what are sometimes justifiable errors in a beginner, in spite of all her tuition. I have heard of a learner fresh from the school being counted as having committed an irregularity when it has been proved the senior operator or the supervisor had not mastered a rule which the girl fresh from the school was studiously carrying out; but if errors are committed it is the work of the clerk-in-charge to see that the supervisor and senior operators of the teams in which the learners are placed recognise it is to their own advantage to help and guide, inasmuch as the success of the division is the sooner effected.

A clerk-in-charge must recognise that her duties are anything but confined to those set down in black and white, but rather, to a

far greater extent, composed of infinitesimal small things, all affecting the efficiency of the service, the tone of the exchange, the well-being and happiness of the operating staff, in which tact, discrimination and common sense are required, and yet which cannot be scheduled as actual duties.

Some people say that nothing is perfect in this world. Nothing will ever be, and it is therefore of no use expecting perfection of people; and so they are calmly willing to accept mediocrity as a sufficiently high standard, and excuse all occasions in which they fall short in somewhat similar sentiments. But I would say to all grades of the operating staff what I often try to impress upon some of our beginners: Aim high; set yourself a high standard. To be satisfied with oneself is to court certain failure. Do your best; be your best in whatever you undertake. You may not climb to the top of the ladder, but you will achieve more than the person who does not attempt to climb. Some of you may not even reach sufficiently high to supervise, but you can be some of the very best operators the "National" ever had to help on its success. We are all units in the mighty whole—little pieces of this huge mechanism—you and I—and each little bit is as necessary, I believe, as any other, and no machine ever yet worked smoothly of which each part was not working in unison with the rest, and with this end in view does it not devolve upon each individual to so co-operate—Metropolitan and provincial—that the mighty machine called the National Telephone Company, of which most of us are so justly proud, works without a hitch? To be jealous of its reputation until the day when its existence as a company ceases, and then to carry forward into the new era the attainment of the high standards to which we have set our hands.

#### HYDRO-ELECTRIC PHENOMENA.

THE *Post Office Electrical Engineers' Journal* gives an account of the electrostatic charging of telegraph wires by locomotives which occurred at Dell railway-crossing station on the Natal-Transvaal main line. The occurrence is described as exceptional, even in a country where extraordinary atmospherical effects are not unusual; but without going any further afield than Glasgow we are able to quote an account of similar phenomena (in connection with a stationary colliery engine and telephone wires) given by Mr. Gill eight years ago in a paper read before the Dublin section of the Institution of Electrical Engineers:

In June last (1902) one of the employees of the National Telephone Company was working on a pole supporting a number of wires (seventeen) running through a rural district near Glasgow. On touching the topmost wire the man received a severe electric shock. On reporting the matter to a member of the Engineer-in-Chief's staff, Mr. Watts, the matter was investigated, and it was found that during certain times sparks could be drawn from the wire in question. This wire was found to be an unused one and was of copper weighing 100 lbs. per mile, about 1,000 yards long, and insulated at both ends and over its whole length. It was carried at a height of 26 feet from the ground, and its capacity would be about 0.087 mfd.

It was at first difficult to explain the reason for the charge as the wire seemed perfectly insulated from all other conductors. The only thing at all unusual about the line was found to be at a point where the exhaust steam from a colliery engine was blown from a distance of about 23 feet by the wind against the wires. The exhaust pipe extended vertically 18 feet and was 3 inches diameter at the top. It was found that the charge only occurred when the engine was working on load, and only when the wind blew the exhaust steam against the wire. Further investigation was made by Mr. Watts, who had a collector constructed of a long bamboo rod with an insulator at the top on which was fixed a number of short pieces of wire with a V.I.R. covered wire connected as a lead to the ground. When this collector was held in the steam near the mouth of the iron exhaust pipe a series of sparks was obtained from the covered lead, and the origin of the charge completely located. The weather during these experiments was exceptionally dry, and the charge could not be obtained on damp days.

Since that date Professor Magnus Maclean of Glasgow, having had his attention drawn to the phenomenon by Mr. Valentine, the Company's District Manager, has conducted some experiments by means of a portable electrometer. He found that when a similar collector to that already mentioned, but with the lead wire terminating above the ground, was inserted near the steam, continuous sparks of  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch long could be obtained between the end of the lead and a metal rod driven into the ground, the best results being obtained when the pressure of the escaping steam was highest. This length of spark would indicate a potential difference of about 40,000 volts. Professor Maclean also took sparks from the lead through his body and noticed that the physical pain experienced was much more severe than from a spark due to about 100,000 volts' pressure derived from a large 24-plate Wimshurst machine.

Professor Maclean also tested the potential of the air 6 feet above the ground and found when under the issuing steam and about 12 feet from it some



1,100 volts, and at a point 30 feet from the steam about 900 volts, when the engine was working. The electricity generated was positive in each case. Of course, the hydro-electric effect of steam under pressure is well known and has been investigated by Faraday and by Armstrong, but it is very seldom that the effects are seen in the natural order of things.

The longest spark in the Natal instance had a value in kilovolts of 14.3. It will be seen that those referred to by Mr. Gill reached 40.

### TELEPHONE WOMEN.

#### LXVI.—MINNIE REILLY.

MISS MINNIE REILLY entered the service of the National Telephone Company in Manchester as an operator in May, 1892, and has therefore had eighteen years' varied experience of telephone work. She has had experience in magneto, call-wire, call-key ring through and central battery working.

After eight years as an operator Miss Reilly was promoted to the position of supervisor in 1900, and assistant clerk-in-charge at the Manchester Central Exchange in 1907. This was then the largest provincial exchange in the Company's system. On account of the excellent work she did while holding the position of assistant-clerk-in-charge she was, at the opening of the new City Exchange, which is a central battery equipment with 4,000 working lines, appointed to the responsible position of clerk-in-charge which position she still holds.



MINNIE REILLY.

Miss Reilly is before all things an enthusiastic telephone woman. She has taken and still takes a keen and intelligent interest in the progress of her exchange, and her ambition is to have a thoroughly efficient and contented staff. While holding the reins of discipline firmly she is very tactful in the manner in which she deals with her staff, and is therefore very popular.

In connection with the operators' social gatherings, Miss Reilly is a prominent figure, and does not hesitate to add to the pleasure of these gatherings by taking a personal part in the various entertainments. Although she does not confess to any special hobby she finds much of her recreation in whist and reading.

Miss Reilly may also be said to come of a telephone family, having several brothers and sisters earning their livelihood in this industry, one of her sisters being clerk-in-charge of the main exchange in Mexico City.

#### LXVII.—HARRIET STAMPER.

MISS HARRIET STAMPER entered the service of the Mutual Telephone Company in Manchester in July, 1893, and was transferred to the National Telephone Company's service in February, 1896.



HARRIET STAMPER.

In January, 1903, Miss Stamper was promoted to the position of chief operator at Rusholme, which is one of the principal sub-exchanges to the Manchester area. In March, 1908, owing to the growth of the Rusholme Exchange, Miss Stamper received the title of Clerk-in-Charge, and when the new central battery equipment superseded the old magneto equipment she was transferred to the new exchange in the same capacity.

During the time the work in connection with the new exchange was in progress, and in connection with the special training of her staff to prepare them for central battery operating, Miss Stamper spared no pains to make the transfer, as far as her department was concerned, a thorough success; she has imbued her staff with a very healthy *esprit de corps*, and she therefore gets thoroughly loyal service from her operators.

Miss Stamper is an elocutionist of more than average ability and some twelve months ago she was elected a member of the Manchester Association of Elocutionists. Recreations are, however, only secondary considerations with her; as she is thoroughly wrapt up in her work, which holds first place in her affections.

## REVIEW.

*Die Europäischen Fernspreckgebührentarife (the European Telephone Rates).* By Dr. Erwin Günther. Published by Gustav Fischer, Jena. 263 pp., 6 marks.—This book, which is a monumental compilation, contains very complete and useful tables of both local and trunk line tariffs for all European countries, from 1879 to the present time. The British tariffs are arranged in periods, 1879-92, 1892-99, 1899-1907, and since 1907. The various grades of measured and party line rates now in force are given in detail, and, considering the modifications which have been made in them, on the whole with great accuracy. It is a pity, however, that no mention is made of the private branch exchange tariff, which is such a feature of the measured rate system of this country. The only criticism we have to make respecting the British rates is that the author omits to mention that the Company introduced the £5 and £4 message rate in London at the same time as the Post Office, and does not make it clear that the Company's and the State tariffs for London are in all respects identical. A small point is that there is nothing to show that the old rate for members of Parliament was £2 per month, and was qualified by a minimum payment of £5. The flat rates for municipal systems are given at the bottom of page 152 as ranging from £5 to £10; as a matter of fact they varied from £5 at Swansea to £6 6s. at Hull.

The book also contains tables of the telephonic development year by year of all countries in Europe—in most cases since 1885, although the record of Great Britain begins at 1903. There are about 100 pages of prefatory matter dealing with the bearing of telephone development on national economics, the importance of the tariff question, and the technical, administrative, economic and financial principles underlying the building up of a tariff, in all of which the reader will find much that is interesting and instructive.

In discussing the question of private ownership Dr. Günther says:

In Europe the activity of the State-licensed private companies without competition led mostly to the introduction of unreasonably high monopoly prices. This is very significantly shown in the development of the telephone system in England, where even the simultaneous establishment of State and private exchanges in the same places was unable to attack the monopoly prices of the National Telephone Company. The complaints of the bad service and unyielding attitude of the Company in England were not silenced until the State, looking forward to the taking over of the whole system at the end of 1911, undertook the energetic construction of local systems.

This is not a very accurate description of the events of 1898 and their outcome. Judging by his references, Dr. Günther has relied chiefly on German sources and on the publications of the Bureau International. He might have consulted with advantage Professor Meyer on *Public Ownership and the Telephone in Great Britain*, who states that if the Committee of 1898 had been governed by the evidence submitted to it and not been swayed by the bias of Mr. Hanbury it would have found a verdict not unfavourable to the Company. As regards the energetic extensions to which Dr. Günther refers, beyond the establishment of friendly competition in London at mutually agreed rates, the activities of the Post Office have been confined to exchanges in country places of the least commercial importance. Of the municipal systems called into existence by the new Government policy the two largest (Glasgow and Brighton) were sold to the Post Office, Tunbridge Wells and Swansea to the Company, while Hull and Portsmouth are still in existence; they were not all absorbed by the Government, as stated on page 155.

Of the advantages of State administration the author says that this alone is able

to regulate tariffs satisfactorily according to general economic, social and political points of view, balancing the contrasting interests of the users from the higher standpoint of real national interests independently of powerful private interests.

Experience, however, has shown that complete independence of powerful interests is not found in practice to exist under State control. The new Austrian rates caused much dissatisfaction to the large user and were revised; but the considerable reductions which were made were confined to the higher-grade rates alone. The proposed new German rates, prepared in 1907, which were supported by the strongest recommendations of the Imperial Post Office, met with widespread opposition—also from the large user—and, as far as we are aware, are still far off adoption.

In Chapter III, Section 13 (development of a typical tariff

reform), is described how the flat rate was first adopted in America in the early telephone days and how it rapidly spread over Europe. Dr. Günther discusses its well-known disadvantages and inequalities, and also the drawbacks to the system of payment for the cost of installation (in vogue in France, Holland, Sweden, and elsewhere), which hinders the development of the telephone, as the heavy initial charge often frightens away small business men.

Dr. Timotheus Rothen, afterwards chief of the International Bureau of Berne, is credited with first advocating the justness of the system of payment per message. He had the satisfaction of seeing it adopted in 1890 by Switzerland, whose example was followed by the United States and Sweden in the early nineties. In some American cities, however, measured rates had been adopted long before 1890.

In the section "Right Lines for Tariff Construction" we are in hearty agreement with Dr. Günther when he says:

The flat rate . . . is still very widespread to-day. It was justifiable in the first decade of public telephone service when the subscribers were chiefly drawn from larger traders, and the number of their calls in each local system, excluding the capital, did not differ greatly. But even in the second decade, when smaller business men and householders were joined up, the difference in use began to be significant. In the new century the telephone is still more democratic, and is a welcome and often indispensable aid to small businesses and the difference in the use made of single stations amounts to hundreds and even thousands of calls. . . . In these conditions the flat rate must therefore be considered antiquated and should be discarded (pp. 81-82).

After discussing the various factors in the fixing of a tariff he sees the best solution of the question in the separate payment of an annual charge and a charge per call. The book, which has evidently cost much labour and research, is an invaluable one for every telephone administrative department and every student of telephone economics.

## THE SPREAD OF THE TELEPHONE.

UNDER this heading a paragraph appears in *Engineering* to the following effect:—

According to statistics just published, there are in the whole world 9,600,000 telephones, and the lines have an aggregate length of about 20,000,000 kilometres. There are 1,800,000 telephones in Europe, 56,000 in Asia, 9,000 in Africa, 7,700,000 in America (of which 7,590,000 are in the United States), and 53,000 in Australia. Denmark is the European country with the largest number of telephones per number of inhabitants—viz., 33.2 per 1,000 inhabitants; and Denmark has now ousted Sweden from that position, the figure for Sweden being 31.8 per 1,000 inhabitants.

The source of the "published statistics" is not given, but we should imagine that it was American from the liberal estimate allowed to that country. Europe is surely far enough behind without its 2,400,000 telephones being diminished to 1,800,000. The obtaining of complete telephone statistics for the whole world is notoriously difficult, and, in fact, practically impossible. America, especially with its innumerable small independent companies, affords a favourable field for magnificently generous estimates; but we think the intelligent estimator of the above statistics might have extended some of his generosity to the old world.

In the Viennese *Electrotechnik und Maschinenbau* Herr von Hellrigl recently published an article on the telephone statistics of the world. He deals in round figures and, outside of Europe, has had, of course, to supplement accurate information with estimates—as was done in the articles published in the July-November numbers of the JOURNAL. It may be of interest to compare the three sets of statistics:—

	<i>Engineering.</i> (Thousands.)	<i>Von Hellrigl.</i> (Thousands.)	<i>National Telephone Journal.</i> (Thousands.)
Europe ... ..	1,800	2,500	2,381
Asia ... ..	56	100	100
Africa ... ..	9	7	25
America ... ..	7,700	6,900	7,097
of which U.S.A. ....	7,590	6,600	6,870
Australia ... ..	53	70	79
World ... ..	9,600	9,500	9,682

The first set of figures are absurdly out as regards Asia, where Japan is known to have, officially, over 70,000 telephones. Von Hellrigl does not do justice to Africa, where in Egypt alone the Telephone Company of Egypt has more than 7,000 stations, without taking into account Algeria and the whole of South Africa. His figures, and those given in the JOURNAL apply to Jan. 1, 1909. The number of telephones now in work is certainly considerably over 10,000,000.



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[No. 50.]

## BUDGETS AND TELEPHONES.

It is far from our intention to awaken in our reader's minds by the first of the above words memories of the political tumults of the last twelve months, or to exacerbate the feelings of Liberal or Conservative by referring to matters so far outside our province. Nevertheless the word *budget* has its meaning for telephone men, and in the future will have a special significance for the telephone-using community and all friends of telephonic progress. Already in the principal countries of Europe the financing of telephone development rests with the State, and as the postal budget in each year is liberal or the reverse so is the progress of the telephone in that State foreshadowed.

But, as we have often remarked before, Government Departments have their own ideas as to the amount of capital which should be allotted each year to telephone development, and these ideas are based upon a curious sense of economy. Money must be freely spent on the telephone system because it cannot stand still; nor, from a national standpoint, ought it to stand still, especially as the capital expended upon it is productive. The high development of America is a standing triumph for unrestricted, unhampered private enterprise. Even in the countries so frequently held up to our admiration in Europe, Sweden and Denmark, a company owns the majority of the telephones in Stockholm, and in Copenhagen the Copenhagen Telephone Company holds the field. On the other hand, populous France has no city possessing 10,000 telephones outside Paris, and, as will be seen from an article we publish in another column, even Germany, the country having the largest number of telephones in the world except America, has reduced its budget this year from 45 millions of marks to 25 millions. Well may a Berlin official journal wonder whether it is right to be parsimonious with regard to money-earning plant which pays for itself.

Even if a good reason for open-handedness, viz., that capital which the State expends on the telephone is productive, did not

exist, it would still be in the interests of the community to further the rapid development of the quickest means of communication, to place no hindrances in the way of its expansion, but rather to facilitate the means for placing it within everyone's reach. The necessity, the indispensability of the telephone in business is now absolute; for national economic reasons sufficient money for its fullest and most adequate development ought not to be grudged, and having in view the revenue-earning capabilities of the telephone is there any reason for parsimony?

In this country, although its development is almost entirely due to private enterprise, that enterprise has not been free from governmental restrictions. Royalties, frequent changes of government policy, and, above all, limited tenure, have acted as brakes on all efforts to get up speed or to overtake rival countries. Some few years since the telephone stations of this country were increasing at the rate of 50,000 and 60,000 a year; but for the last two years the increase has been about 35,000.

London, with its 6,000,000 inhabitants, possesses some 180,000 telephone stations, or about one-quarter as many as it should possess in comparison with New York, or one half in comparison with Berlin. Its net increase for the last three years has been between 16,000 and 17,000, and the percentage of increase has fallen from 13 to 10. When the Post Office commenced operations in London (supplementing the efforts of the Company, whilst at the same time restricting the area of the latter's activities) the rate of increase was 25 per cent. and over. The reasons which have relaxed the Company's efforts are well known; but the Post Office rate of increase for the last three years has also fallen to 20, 13 and 14 per cent. respectively.

Great Britain has some leeway to make up in telephone development, and the present therefore is not the time to progress at half-speed. Private enterprise will soon have ceased to provide capital for further expansion of the telephone, and then that industry will have to look each year to the Budget. It is our sincere hope that the future may develop in the Treasury an appreciation of Great Britain's telephonic needs, and with that appreciation a greater open-handedness, and that, adopting an attitude at once broad-minded and businesslike, they will furnish the means of developing this great economic necessity with no niggardly hand.

## THE GERMAN TELEPHONE BUDGET.

FROM *Blätter für Post und Telegraphie* we learn that the supplementary German budget for telephone purposes amounts to 25,000,000 marks, or about a million and a quarter pounds, which will be raised by means of loans and applied to plant of lasting value and ensuring satisfactory returns. The loans will be redeemed, as usual, out of the receipts of the Post and Telegraph Department. The following figures and an abridgment of our contemporary's comments on them will be of special interest at the present time:—

The amount of the supplementary budget is substantially less than in previous years (1907, 44·8 million marks; 1908, 60 millions (inclusive of half a million for the Emden-Borkum cable); 1909, 45 millions). These amounts are allotted as follows:—

	1907.	1908.	1909.	1910.
	Million of marks (roundly).			
1. Changing aerial telephone lines to underground, building ducts, laying cables, etc. ... ..	12·4	70	73	60
2. Laying telephone cables for the extension of existing telephone systems		15·6	16·0	13·0

	1907.	1908.	1909.	1910.
	Million of marks (roundly).			
3. Introduction and change over of multiple working in the larger exchanges .. .. .	5.9	5.0	4.2	3.8
4. Erection of junction (trunk) wires	21.5	26.5	14.0	1.7
5. Introduction of metallic circuit working	5.0	5.5	3.5	0.5

It will be observed, says the *Blätter für Post und Telegraphie*, that the expenditure on the introduction and transformation of multiple working in the larger exchanges decreases slowly but steadily. It is most noticeable that the outlay for the laying of telephone cables and for extending the system is three millions less than last year, and that for the erection of trunk wires only 1.7 millions are required. The increases of stations in the years 1899 to 1908 were 22,987, 52,009, 44,159, 45,420, 49,474, 58,225, 65,877, 76,436, 78,651, 72,676. It will be seen that the yearly increase, with the exception of the year 1908, has continuously grown. It will require the greatest economy to supply all the required new connections with the specified sum of only thirteen millions. We hope it will be sufficient.

The amount for the erection of new trunk wires, that is for the improvement of the long distance traffic, was only 7.9 per cent. of the expenditure for the year 1907, 6.4 per cent. of the expenditure for 1908, 12.2 per cent. for 1909. When one considers that the number of trunk messages in 1906 was 207,192,710, in 1907 230,268,164, in 1908 231,347,000, that they therefore increased in 1907 by roundly 23 millions as against one million in 1908, it might appear only natural for this sum to be noticeably decreased; but it must be remembered that there is now every prospect of a great further increase, and that in many places the number of trunk lines gives very scanty accommodation. In any case this accommodation would be too strained to satisfy the needs of the increasing traffic with so small a sum and to avoid a set-back to the progress of telephone work. Whether it is just and "commercial" to be parsimonious with money-earning plant which pays for itself so well appears questionable. In this connexion an excessive economy would appear to be harmful for the postal and imperial finances. It appears to us to be pressingly necessary on various grounds to provide satisfactorily the means for telephone purposes. It cannot be denied that the Postal Administration has not only been able to fill the requirements of the telephone traffic, but that its introduction and development is due to its initiative. The history of the development of the telephone up to and including the new tariff law will be ascribed without doubt to the credit side of Postal Administration, even if to-day the new tariff scheme is one of the favourite points of attack and is gladly used as an example of the backwardness and hostility to commerce of the Postal Administration. . . . Lately some of the numerous critics of the Administration have reproached the Department with extravagance. We can, on the contrary, only express the hope that the Administration is not driven to false economy. Our neighbour France is a classic example of how not to economise. By reason of the small means which Parliament allows for telephone purposes, France is now faced with the question, which cannot be postponed, of renewing an altogether backward and antiquated system at double cost. In ten years they will hardly be in a position to make up for lost time. . . . As regards our trunk lines, their condition has become needful of improvement—this could not be otherwise with the rapid growth of the traffic—but the Administration have always had the necessary means to erect new lines at the right time. Therefore the figure of 1.7 million marks for new trunk lines, and the figure of 25 millions in all, is calculated to remove the fears of the telephone subscriber and of the Postal official concerned for the honour of his Department; and the Administration will not have decided on its modest demand without the fullest consideration. . . . It must always be remembered that the Postal Administration is a traffic concern, that a State Department in the interests of the State handles non-paying business, but in the extension of paying branches of its work must act as a business man, *i.e.*, it must put money into the business which will not pay for some years, but then yield good interest. Therefore the earning capital of the Postal Administration ought not to be cut down. We hope that next year's supplementary budget will again contain more liberal provisions.

## HIC ET UBIQUE.

MR. F. GILL, the Company's Engineer-in-Chief, was in Portugal at Easter, when he inspected the telephone systems of Lisbon and Oporto.

A RECENT visitor at Head Office was Mr. Risuke Wakameda electrical engineer, Department of Communications, Tokyo. He is now visiting five or six of the principal provincial exchanges.

THE Liège Association of Electrical Engineers asks us to give prominence to the triennial prize of the *Fondation George Montefiore* for the best original work for the scientific advancement of the technical application of electricity. The prize is 20,000 francs, and the jury is formed of five Belgians and five foreigners. The work may be in English or French, and should be addressed to M. le Secrétaire-Archiviste de la Fondation George Montefiore, rue St. Gilles 31, Liège, before March 31, 1911.

WE have often quoted very personal paragraphs from rural American journals in which the local telephone operator played the leading part. Here is an English example from the *Derbyshire Advertiser* referring to a small Derbyshire market town:—

It is very refreshing to find here one place at least unimpaired by the incapacity, apathy, and dilatoriness which are corroding the very life of the town. This happy spot is the public telephone office where, thanks to the businesslike promptitude and determination of the clever little operator, one is placed *en rapport* with one's correspondent in a remarkably short space of time.

A GLOUCESTER correspondent sends us as a sign of the times an advertisement of a "Young Business Gentleman" who, in enquiring for a bedroom and sitting-room, wants to know whether the telephone is fixed.

## THE ATTACKS ON MR. ANNS.

WE congratulate Mr. Albert Anns, the Secretary of the Company, upon the successful result of the legal proceedings in which he has recently been engaged, and all the readers of the JOURNAL who have read the report of the case will, we are sure, join in our satisfaction. For a long time Mr. Anns has been the subject of attacks upon his business reputation which must have been peculiarly objectionable to him, but so long as those charges were circulated only amongst those with whom he was in close business relationship, and who knew how groundless they were, he could afford to disregard them. When, however, a wider publicity was given to the libels Mr. Anns had no alternative but to invoke the procedure of the law, and as the result of a verdict and judgment given in the King's Bench Division, and confirmed by the Court of Appeal, he has been entirely justified and the attacks made upon him have proved to be baseless.

In the trial before Mr. Justice Grantham and a special jury, a verdict and judgment in favour of Mr. Anns were given without the necessity of calling upon him to give or produce any evidence on his own behalf, and an appeal by the defendant for a new trial was dismissed by the Court of Appeal without calling upon Mr. Anns' counsel to reply. Mr. Anns made it clear that he had no vindictive feeling in the matter by asking only for nominal damages, although he has been put to great expense and trouble in relation to these proceedings, and it is to be hoped that he will not experience any further annoyance.

## NATIONAL TELEPHONE CHESS CLUB (LONDON).

THE second season of the above club has just been brought to a close, and although not much success has been met with in the matches, the club is in a much better position financially than last year.

Ten matches have been played, all in the Civil Service and Municipal Chess League, but owing to the fact that in several of the matches some of the best players were not available only one was won, some others, however, yielding very close finishes.

The secretary states that a proposal to form a draughts section is being brought up at the next general meeting, which will be held on May 9, and he will be pleased to receive any suggestions as to likely support in this direction, as early as possible.

Communications should be addressed to Mr. R. P. Lowe, 17, West India Dock Road, E.



# LONDON AND ITS ORGANISATION.

## ELECTRICAL.

By J. STIRLING, *Metropolitan Chief Accountant*, and G. F. GREENHAM, *Metropolitan Electrician*.

(Concluded from page 9.)

One difficulty in the Maintenance, as in all other technical Departments, is the training of men thoroughly, so that results may be efficient and economical. It never pays to have an inefficient man, but it has to be borne in mind that inefficiency may spring either from lack of capacity or lack of opportunity to learn. No up-to-date administration can afford not to make provision for the latter. The policy of the Company is to give every member of the staff as much knowledge relative to his work as possible, and in such a manner as to be readily assimilated. Attendance at Technical Classes is encouraged, and the results carefully noted by the Chief Officers.

The oversight of expenditure is less formidable now than a year or two ago. At one time each Exchange Electrician had to send in careful details of the money he wanted, and having got his grant, spent an inordinate amount of time checking every penny expended, so as to avoid "rows" at the end of the month. Now, our check is no less keen and effective, but much less cumbersome and wasteful. On general maintenance, the wages spent naturally depend on the number of staff employed. By estimating that number six months in advance, we can fix at the beginning of each half-year the amounts required, and these are notified to the Divisional Officers. If for any unforeseen reason a variation is necessary, the matter is specially dealt with. As regards materials, experience has shown that in any half-year there is a definite ratio of materials to wages; any departure from that will mean abnormal expenditure, the cause of which will be known to the local officers, and must be sanctioned. This arrangement is simple, works well, and involves a minimum of clerical work at the technical end. Statements of costs in the various Exchange Electricians' areas are sent out from the Chief Accountant's office each six months; these are divided, for comparative purposes, into groups within which the

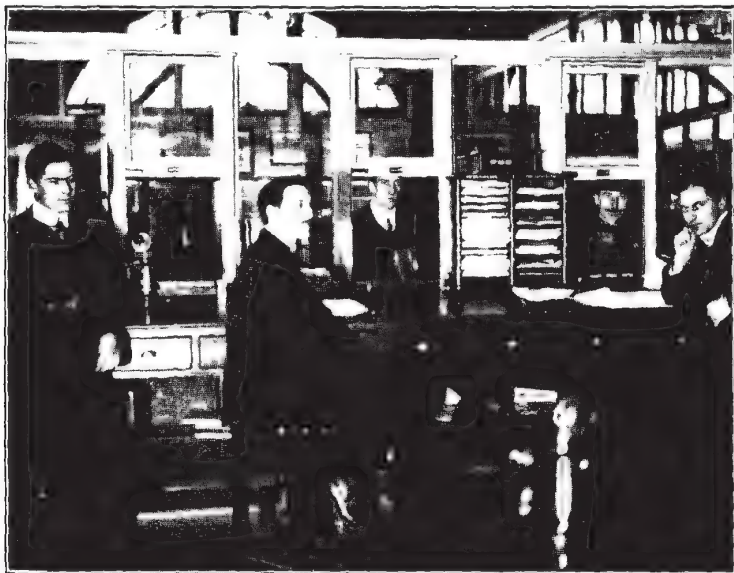


FIG 3.—"FITTING" OFFICE, GERRARD.

type of plant, conditions of transit, etc., are similar. The healthy rivalry thus engendered is not likely to lead to economy being fostered at the expense of efficiency, as the periodic reports on the percentage of faults, time taken to clear, and inspections carried out would, apart from the active supervision exercised, soon show up the weak spots. As a matter of fact, good results and cheap results are not rare companions.

Outside faultsmen are, for obvious reasons, on the Electrician's staff; only special faults involving renewals, cable changes, overhauling, etc., being given to the Engineers. An essential for the rapid clearing of the latter class of trouble is a close and friendly relationship between the local officers; given this, the best results to both Company and subscriber are assured. In London at the present time there is happily little to be desired in this respect. A

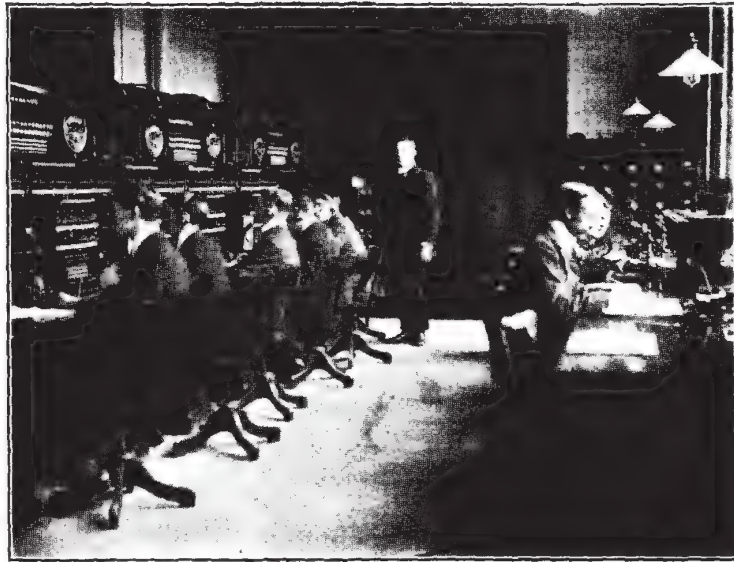


FIG. 4.—TEST AND FAULT CLERKS' TABLES, GERRARD.

town faultsmen's lot is not always a happy one; to him city roofs are less risky than busy streets, and a giddily-perched pole as safe as the top of an omnibus; but the irate householder is not always easily appeased, nor the elements a cause of blessing when the rain descends, or the enveloping fog casts its dark mantle over housetop and street.

Although we have placed Maintenance work first, it is not from any feeling that it has prior claims over the Construction Department. Between two branches of work so bound up with and dependent upon each other there can be no possible rivalry. Emulation as to results there may be, and that is worthy of encouragement, for it is an unfailing sign of interest. That good fitting means inexpensive maintenance, and good maintenance means credit to the fitting staff for well-executed work, goes without saying.

The "Construction" organisation is on similar lines to the "Maintenance," but necessarily modified in some particulars. There are four Divisional Constructional Electricians, each having under him a Divisional Fitter, the latter officer controlling the Fitters, arranging their work, deciding questions that arise, giving advice, and generally seeing that his Works Orders are cleared with regularity and expedition. Fitting Inspectors, whose duty it is to examine and report upon all new fitting work, are also provided.

At one time a considerable amount of switchboard work was done by the Construction staff. So far as the Company's exchanges are concerned, very little is now executed, except at small places. It has been found that large switchboards and extensions to them can with advantage be entrusted to outside contractors; this policy has been adopted at all large common battery exchanges. The local staff have by no means been deprived, however, of all opportunities for showing their skill, as some of the switchboards operated on subscribers' premises are by no means small or easily fitted. One or two of the largest are:—

	Exchange Lines.	Extensions.
Army and Navy Stores	... 24	298
Savoy Hotel	... 16	233
London County Council	... 15	184
Whiteley's	... 28	137
Selfridge's	... 20	163
Queen Ann's Mansions	... 14	837

With the inevitable extension of a message rate, this class of work will certainly tend to increase. Assuredly no subscriber who has once experienced the advantages of a modern system in a large business would desire to return to the old out-of-date arrangements under which the few instruments provided were always engaged, and clients therefore took their business elsewhere. In connection with subscribers' switchboards, it is of interest to record that one firm on Holborn Exchange have a blind operator. His work is all done by means of his acute sense of touch, and the result is an excellent service.

The total *personnel* of the Construction Department is 158. They fit an average of 320 Stations per week, recover 140 and carry out other jobs, such as removals, sales, fitting extension bells, jacks, etc., to the extent of 430 per week. Power circuits for subscribers' use are constantly increasing, and on Gerrard Exchange alone the number now exceeds 500.

Works Order routine at the Fitting Offices has been gradually evolved from various methods in vogue from time to time. Slight alterations in procedure are occasionally made, but no change of any moment has been needed in the general principle since its adoption a few years ago. When a new line works order is issued by the Chief Accountant's office the blue slip is sent direct to the divisional fitter, who places it in the "Waiting for Engineers" compartment of his works order distributor. The slips are in alphabetical order, so that they can be easily extracted and transferred to the "Work to be given out" distributor immediately the pink slip signifying that the outside work is completed arrives from the engineer. All three slips of any works order on which outside work is obviously not required are sent by the Chief Accountant to the Fitting Office; these are immediately on receipt placed in the "Work to be given out" distributor. The latter has divisions for the various classes of work, and the works orders are arranged in date order so that those most recently received will be at the bottom of the group. Removals and new lines are usually treated as more urgent than other classes of work, but obviously there must now and again be exceptions both to this salutary rule and to the one prescribing that orders must be executed in regular date sequence, so that undue preference will not be given to an importunate subscriber.

A works card, on which are entered the works order number, subscriber's name and address, particulars of work, and some other essential particulars, is used for each fitter. As soon as a job is given out these details are entered, the blue slip handed to the fitter, and the pink slip with the card attached placed in the distributor under the fitter's number. As the cards become filled they are filed away, and from them particulars are forthcoming should any question afterwards arise on any fitter's work. The time sheet used for the allocation of wages is made up by the Divisional Fitter's clerk from the cards. It has horizontal headings for "New," "Ceased," "Removals," etc.; the vertical columns are used for recording the works order number and hours worked on each job. One sheet contains space for twenty names. The fitter's clerical work is thus confined to the particulars required on the back of his works order form. A bald description can only give an imperfect idea of the system. That it is complete and sure is evidenced by the rapidity with which orders can be dealt out to a large staff, and further instructions given as the men telephone from their various jobs throughout the day.

Fitters, like inspectors, meet with odd experiences, and hear all sorts of innocent observations made by people whose knowledge of the telephone is about as extensive as their acquaintance with the Mountains of the Moon. One fitter tells that, having connected an "A" to "B" line on a switchboard just moved into new premises for a firm of stockbrokers, he tried the line from the distant end to the switchboard, but no response could be obtained. On returning to the switchboard to ascertain the cause, the fitter was greeted by the builder's man with: "Was that you ringing? I thought it was you, and shouted down the hole you had been working on, but couldn't hear anything, so gave it up." He had been spending his energy shouting into the jack; another variation of the speaking-tube notion. Clearly the ideas of the man in the street on electricity and its uses are woefully vague and undefined. There is a tradition in London that a fitter was once locked in by an irate subscriber, who then telephoned to headquarters and declared that he would not release the man until the Company changed the instrument.

Enterprise and originality always appeal to one; we confess, therefore, to a sneaking sympathy with the subscriber.

An interesting point of view was that of the lady whose husband was repeating to her the instruction just given him for operating a switchboard. To his innocent observation, "This is the answering plug of the telephone," she replied, "Very objectionable if it has to be placed in everybody's ear." Mouthpieces apparently are not the only parts of our apparatus which occasion hygienic outbursts.

Another illustration of a little knowledge making a man say amusingly foolish things is the case where a new subscriber called attention to some old wiring, and on the fitter tracing it to the water pipe, remarked, "Oh! the old tenant evidently had a telephone to the water company"; a new form of *a posteriori* argument.

The installation at Buckingham Palace will doubtless be of general interest, not because of any particularly unique features, but owing to that feeling of loyalty to His Majesty which makes everything connected with his *entourage* possess a peculiar attraction for his subjects. A 60-line floorboard is installed in the Post Room; this is operated by the Company during the day. At night, by means of a special change-over switch, all connections are transferred to a duplicate board in the Equerry's room, and it is worked by the Palace officials.

Special installations to large halls and buildings where shows and exhibitions are held are not uncommon. At Olympia, the immense spaciousness of which is known to most London visitors, the Company has a permanent cable to Kensington Exchange, so that stands and call offices can be connected with great rapidity. In connection with the recent great Motor Show, which attracted visitors from all over Europe, nearly 80 telephones were installed for exhibitors, and several public Call Boxes were also available.

Although the troubles attendant upon the change-over to central battery working of the London exchanges at which that system was first adopted are fast disappearing into the limbo of forgotten things, the outlines of some of them are still green in the memories of the staff who played leading parts. We have become inured, or rather accustomed, to such changes now, and look upon them as quite ordinary events in the course of business. Things were otherwise at the beginning.

Difficult and complex as the task may well have seemed to the staff responsible for smooth working at the exchange, the real and most inscrutable problem of a change to common battery working was the subscriber. What patience and tactfulness were exercised in dealing with him and bringing him to reason! What argumentative and persuasive powers were revealed in and developed by the canvassers to whom the duty was entrusted! What sudden affection was shown for the old instrument, the shortcomings of which had been so apparent until we proposed to take it away and substitute a type as yet unknown! Now that the struggle is over, the amusing side is uppermost; at the time, the humour was not so apparent to either party in the controversy.

The principal objection to the new instrument was the loss of the hand micro-telephone, with its speaking key. Then subscribers prone to becoming impatient did not like losing their generators; it was a relief to the feelings to "grind the machine" at such times. Some did not want a fixed transmitter; others objected to the bell-box; while another section made a strong point of the instrument's non-adaptability to height. Time and experience have proved the wisdom of the change, and to-day, reading through a report from the officer in charge of the work, one wonders at the tempest of opposition which had to be encountered. One gentleman listened very quietly to the description of the new apparatus; he then called in a stenographer, stood with his back to the door, and dictated to the Company's General Manager a letter dealing very "faithfully" with "the young man who is going to take away the instruments I have had for years." Only when the letter had been signed and despatched to the post was "the young man" allowed to go.

After the conversion, the number of subscribers wanting the old instruments back was legion. It was generally found that those who had been too impatient or busy to listen to our representative's description were those who grumbled loudest. One City subscriber went so far as to offer £50 for the return of his hand micro-telephone set: whether, had the proposal been accepted, settling



day would have shown it to be genuine is doubtful. With very delightful *naïveté* the Company's officer in his general report remarks: "Where subscribers objected to the arrangement of the instruments after conversion, their objections were patiently listened to, and treated as if they were quite novel and fresh, and as if it was most unusual for a subscriber not to like the common battery instrument." Such admirable self-suppression and diplomatic silence reminds one of Alice's reply to the Mock Turtle's remark: "Perhaps you were never even introduced to a lobster"; Alice began to say, "I once tasted," but checked herself hastily and said, "No, never."

The number of central battery exchanges in London is now 21, representing 76 per cent. of the total Exchange Lines. The power supply for one year costs over £1,700, and the extensive power plant entailed in the exchange buildings has added considerably to the responsibilities of the Maintenance staff. One gratifying result of the establishment of so many new exchanges, with their spick and span modern equipment, has been a general smartening up—or, rather, toning up—of the staff to their changed surroundings. There is a much keener interest in the work, attributed, not without cause, to the pride which the men naturally feel in the handsomely fitted apparatus entrusted to their care, and their desire that neither its reputation nor theirs should be tarnished if they can prevent it. It is an admirable spirit, and should be encouraged. It also proves an old thesis of all reformers that environment has an important part to play in the results a man achieves.

Without men who can carry out faithfully, sensibly and successfully the orders given to them, no enterprise can show abiding prosperity. Organisation, system, discipline, forethought—all can do much, but officers in positions of authority know that these qualities must be supplemented by an intelligent and able staff if success is to result. It is a deserved tribute to the rank and file of both branches in the Electrical Department that their work as a whole is a credit to themselves and an appreciated asset to the Company.

## ACCUMULATORS AS APPLIED TO C.B. TELEPHONY.

By J. R. MILNES, *Engineer-in-Chief's Department.*

It is not widely enough recognised that the accumulator used in C.B. telephone work has duties to perform which are very dissimilar to the work for which the majority of large batteries have been designed.

Even under the best conditions two factors arise which are, as we shall see, mutually opposed. The object of these notes is to discuss briefly the two opposing functions with a view to reconciling the antagonistic demands made on the accumulator and arriving at some idea as to the most suitable type of plate.

A central battery has two functions to perform:

- (1) To supply current to the exchange.
- (2) To act as an insurance against breakdown (*i.e.*, failure of mains, supply, etc.).

At first sight the conflicting element in these two functions is not evident. To keep a battery in good condition the majority of makers state it is necessary to keep it as far as possible in constant work, that is to charge fully and discharge fully at frequent intervals, with an occasional overcharge as a tonic. The makers further state that continual overcharging is as deleterious as insufficient charging, rendering the positive plates soft, and liable to buckle and disintegrate.

This is not all; unless the battery is completely discharged at periodical intervals, what is known as "internal sulphating" takes place in that portion of the active material of the plate which is out of general use, and is really the stand-by of the exchange in case of emergency. This internal sulphating would result in about a year in the *entire loss of spare capacity in the battery* if no steps were taken to prevent this. Fortunately it is possible to a great extent to combat this by fortnightly overcharges—in nearly all cases at the sacrifice of part of the life of the positive plate.

Here we find a dilemma. In a telephone exchange it is the practice always to retain sufficient capacity in the battery to enable

the exchange to be run for at least twelve hours beyond the usual time for recharging as a precaution, or insurance, against emergency or breakdown. This applies more particularly to exchanges where duplicate charging machines are provided; where only one charging machine with a spare armature is installed it is customary to provide an even greater margin of spare capacity on account of the greater risk.

Let us summarise our deductions briefly at this point. We have found:

(a) That continual overcharging shortens the life of the battery.

(b) That complete discharges are necessary to keep the unused or emergency capacity of plate exercised *unless these are overcharged*.

(c) That if we do not face one or the other of the two previous deductions we lose in about one year's time that spare capacity on which the whole exchange relies in case of emergency.

If we cannot get a plate which will not suffer from internal sulphating, or failing that, which can stand continual overcharging to avoid internal sulphating, we have to decide whether the life of the battery or the breakdown factor of the telephone service is to suffer.

We can at once dismiss the course of discharging the battery completely at even quarterly intervals, as it is without doubt the correct policy to take every precaution against the possibility of an interruption in the telephone service.

We then have only two choices—*viz.*, either to prolong the life of the battery and lose our spare capacity by avoiding overcharging, or to overcharge regularly and decrease the life of the positive plate. Perforce accepting the latter alternative, the whole question resolves itself into a search for the best plate for telephone conditions.

Two side issues suggest themselves here which we can deal with at once. I used the words "prolong the life of battery and lose spare capacity" just now. To understand this rather anomalous statement we must bear in mind that during the normal growth of current consumption the internal unused position of the plate, which we will imagine has sulphated, gradually and automatically re-forms as required as the charge increases with the number of subscribers. Thus, although we have no emergency spare capacity, we have a potential material which is gradually being converted to active material for the normal growth of the exchange.

Secondly, we have not taken into account as yet the fact that a battery is designed with plates for some years ahead of actual requirements at the time of installation.

Now, assuming a normal steady growth of subscribers, and consequent increase in current consumption, the battery is at a still greater disadvantage during the first half of this period than would at first seem the case on account of the larger portion of the spare active material liable to internal sulphating. I will refer to this later.

To revert we must now see if the demand for such a type of plate as we want for telephone conditions has been met.

All commercial storage batteries embody some adaptation of the Faure principle, in which the active material is in the form of paste applied to a retaining grid, or the Plante principle, in which the plate constitutes the active material. The Faure plates have a high capacity in proportion to their weight, and are most suitable, therefore, for purposes where weight is a consideration—portable batteries for example—but they cannot be charged at high rates without damage to the active material, and, however carefully they are treated, Faure plates as positives are very deficient in durability.

Plante plates consist of either solid lead slabs grooved or worked in some manner to increase the surface area, or may be made up of lead strips joined to conducting frames. In the solid type there is want of porosity, and the two sides of the plates may therefore be subjected to unequal action, which is liable to cause buckling. In the strip type there is ample porosity, but the strips usually rot away at the junction with the frame. The main drawback to the use for telephone work of Plante plates as at present made is that the conducting frame is drawn upon to replenish the active

material, and consequently during the life of the plates the conducting area gradually decreases, thus adversely affecting the internal resistance, already high in the solid Plante plate through lack of porosity.

It will, I think, be sufficient merely to consider positive plates of the Plante-formed type similar to those now specified in C.B. exchanges. Negative plates are now made of the pasted type (and I include the "box" negative in this category), without exception by all manufacturers, and in all cases outlast the positive plates—so that the determining factor becomes the life and properties of the positive plate.

If one were to consider in detail the enormous number of plates placed on the market with their many ingenious methods of holding the active material tightly in the grid, one might spend hours; but fortunately time and experience have done this work for us, and out of the many plates that have been placed on the market two types only may be taken as having survived the test of experience in practice.

The first of these main types include all plates of the pure lead type—the makes of which vary little in mechanical structure. The second type we will consider by itself later. I think we may safely avoid any detailed account of the different mechanical forms adopted by the various makers with these two exceptions.

What really concerns us is to find a plate which will (1) suffer least from the continual overcharging necessary to prevent sulphating, and at the same time (2) be able without losing capacity from internal sulphating to dispense with ever being fully discharged.

On the first point we shall shortly find we have theoretically to dismiss all plates except the second type referred to above. On the second point we shall also find that the very feature which makes the second type plate to approximate to the ideal, so far as overcharging is concerned, also does away with the necessity for complete discharge.

Before going further, however, let us consider the effect of overcharging on the positive plate. Lead peroxide occupies a considerably greater bulk than the lead from which it is formed in the Plante type of plate or the litharge from which it is formed in a "pasted" type. This means that during initial formation, or during charging, the active material expands and presses with greater force against the containing grid. This pressure, if not overdone, has its advantages, and is utilised to obtain intimate contact between the active material and the grid during manufacture; but if this is continued beyond the safe limit, as often happens in overcharging in the first type of plate, the lead of the grid itself begins to form, the pressure increases, and something has got to give way.

What generally happens is that the grid buckles or the active material is loosened and falls out. In the latter case, in order to maintain the capacity of the battery, part of the lead constituting the grid has to be formed again after discharge to compensate for what has dropped out during the overcharge. The grid—the strength factor of the plate—is thus being gradually and imperceptibly weakened, active material is depositing rapidly at the bottom of the cell, the cross-section of lead in the grid (on which to a certain extent depends the internal resistance of the plate) is being reduced, and in due course the plate buckles badly, disintegration proceeds more rapidly, and the useful life of the plate is at an end and it has to be replaced.

To overcome this as far as possible, particularly where weight and bulk are of negligible importance, the positive plate has to be made very much heavier than would otherwise be required.

Now it is obvious from the foregoing remarks why the makers are so insistent in their depreciation of continual overcharging to compensate for internal sulphation, and to enable the plate to be at all times capable of giving the full capacity they have to, as far as policy will allow them, clamour for periodical complete discharges.

We may now consider the second type of plate for it is the one plate to which the foregoing does not apply, or rather applies least. The whole point lies in the fact that the active material is contained in a grid consisting of *antimonial lead*, that is to say lead to which a certain percentage of antimony has been added. This grid possesses the important property of not being attacked by the acid, is therefore incapable of being formed, and has only to suffer sooner or later,

from overcharging forcing part of the active material out of the receptacles with consequent loss of capacity. I do not mean it to be inferred that buckling will not take place under exceptional circumstances, but as the strength of the grid is (a) many times that of the same grid made of lead, (b) is not capable of being formed, and therefore does not lose strength it is obvious that for C.B. telephone conditions it is theoretically far and away ahead of the pure lead plates.

This plate differs from the pure lead plate, the active part of which generally consists of a large number of "formed" thin slats in that the antimonial lead of the grid is completely pierced with a series of circular holes bevelled on each side. Into these holes are inserted corrugated ribbons of pure lead rolled up into spirals. The corrugations are so arranged that the acid has free circulation right through the plate from side to side, an important feature. The ribbon when unformed fits tightly at the centre only. When formed the pressure due to the conversion of the lead into peroxide causes the corrugated ribbon to swell until it completely fills the bevelled holes making intimate contact with the antimonial grid.

Now this plate, I am definitely informed by the chief engineer of the manufacturers, does not require complete discharges, and will yet retain its spare capacity provided fortnightly overcharges are given to combat the tendency to internal sulphating in the unused interior portion of the plate. Our own experience confirms this, and the American Bell Telephone Company in all probability specify this type of cell only for this reason in all their exchanges.

A point has been raised in objection to the plate that the antimonial plate being more electro-positive to the active material than pure lead results in increased local action, and the formation of a thin film of sulphate between the pallet of active material and the grid. This, although I mention it for the purpose of reference, has proved to be somewhat of a bogey; the additional P.D. is so small as to appear to be negligible, and there is in telephone work no rapid increase of internal resistance, which would be the case if this local sulphating were to happen. It is of interest to note, however, that in some batteries to which I have recently had my attention drawn where there are long slow rates of discharge and trouble from sulphating, that the *negative* plates "gas" first when charging. Usually the reverse is the case, the positive plate "gassing" first. Now this gassing of the positive plate first is held to be due to the negative plate having become discharged first owing to local action, probably caused by portions of positive active material floating in the electrolyte and falling on the plate after charge. When the positive plate discharges first (*i.e.*, "gasses" last) it is pertinent to ask the question: Is this due to the antimonial grid increasing local action?

In practice we have recently put in central batteries with pure lead positives. I believe the deposit is greater than with similar antimonial plates, but other figures are not available, owing to the short period of installation.

Comparing the antimonial with the pure lead type batteries in magneto exchanges which use moderate-sized batteries for signalling, it has been found that the life of the antimonial positive plate is on an average longer than the pure lead plate. Insufficient data and different duties render definite figures unsafe for any proper comparison, however.

I will conclude with some remarks of the manufacturers. The makers of the antimonial positive plate from their own experience state a fair average life for a chloride positive properly treated is from ten to twelve years. They advise periodical overcharges of 10 to 20 per cent. once a fortnight, and, under these circumstances, say no complete discharge is required to keep the plates thoroughly healthy and the reserve capacity unimpaired.

The makers of the pure lead positive plate are more modest, and claim an average life for a Plante positive of six years, although they say they have known plates well treated and kept "in harness" to last nine years. They also advise that the battery should never be allowed to stand discharged or partly discharged; but at the same time say little overcharging, if any, is required, whilst an occasional complete discharge is necessary, if not essential, to keep the plate in good condition under telephone conditions.

Both makers concur in their statement that the main cause of sulphating in telephone batteries is due to standing with a low discharge rate when battery is partly charged. This leads to



sulphating and consequent growth of positive active material, and the forcing of this out of the grid. The lead ribbon or slat becomes sulphated first of all behind the active material, and on this sulphate being reconverted on charge, not to lead again, but to lead peroxide, it expands one-sixth in bulk and forces the active material to swell outwards.

### LONDON NOTES.

At the London Telephone Society meeting on April 4 the successful papers in the annual competition were read, and the prizes presented. The recipients and subjects were:

Mr. F. Morley Ward, "Notes on Secondary Batteries."

Mr. C. E. Street, "Experiments in connection with Dry Core Cables."

Mr. H. G. Bishop, "Capital and Revenue."

All the papers showed considerable ability.

The officers of the society for the ensuing year were appointed. Mr. Hare, Assistant General Superintendent, was unanimously elected president, with Messrs. Taylor, France and Greenham as vice presidents. There is also a strong committee, so that great things may be expected next session.

FOLLOWING on the transfer of Lee Green Exchange to central battery working, the traffic staff there held an "at home" to give their relatives and friends an opportunity of seeing the new premises and equipment. Much interest was evinced by the visitors in all that was shown to them, and they appreciated heartily the services of the New Cross Exchange Manager and those members of the maintenance staff who assisted him in showing the guests round.

Mr. C. G. SLEIGH, who was recently transferred from the City to North as Local Engineer, was entertained by his colleagues at a farewell dinner, and presented with a case of pipes. Mr. Bascombe, City Divisional Engineer, made the presentation and conveyed to Mr. Sleigh the good wishes of the subscribers.

At the last meeting of the Western Telephone Society, Mr. Greenham, Metropolitan Electrician, read a paper on "Modern Maintenance Methods." Not only was a very full description given of existing organisation and duties of various maintenance officers, but some questions affecting future methods were suggested to the meeting. There were many interesting slides and a good discussion ensued.

THE Eastern district operators had their annual social in Limehouse Town Hall on April 8. In addition to an excellent musical programme, dancing and games occupied the evening. Various prizes were awarded to those who had shown greatest proficiency in the games. Mr. Tattersall made an excellent chairman, and did much to make the gathering a success.

THE last meeting of Telephone Society's Traffic Branch was held on April 18. The prize papers in the competition were read, and the prizes presented to the successful members. The following is the list:—

*Junior Operators*.—Miss L. Grammer, Paddington, "Early Impressions of the Telephone Operator."

*Senior Operators*.—Miss M. Clayton, London Wall, "An Explanation of the Working of an Exchange, Suitable for a Visiting Subscriber."

*Supervisors and Female Clerical Staff*.—Miss K. Howard, Paddington, "Local Observations."

*Exchange Managers, Clerks-in-Charge, and Male Staff*.—Mr. L. E. Cohen, Observation Office, "Observation, its Achievements and its Possibilities."

During the evening Mr. Deane replied to various criticisms passed on his paper at the previous meeting. To Miss Minter was extended a cordial vote of thanks for her services in the chair during the evening.

THE annual meeting of the Metropolitan members of the Staff Transfer Association took place at Salisbury House on April 1. The officers were elected and a new committee appointed for the year. The most noticeable change is the substitution of Mr. R. H. Carter for Mr. A. R. McFarlane as secretary. The latter could not, unfortunately, see his way to continue in office. His successor is an able worker, and can be trusted to fill the post with credit both to himself and the association. A resolution of confidence in the central committee was unanimously adopted by the meeting. In proposing and seconding it, excellent speeches were made by Messrs. Greening and Dowdall.

OUR Brighton *confirés* are desirous of trying conclusions with us at cricket on a Saturday in June. Nothing definite has been settled, but, given good weather, a trip to the sea ought to be an attractive fixture in the early summer. Our cricketers would, no doubt, be ready to give a good account of themselves.

### GLASGOW NOTES.

THE closing meeting of the telephone society was held in the Hillhead Exchange on the evening of Wednesday, March 23, when 95 members were present. Tea was served from 6 p.m. to 7 p.m., and thereafter Mr. Thomas Pettigrew delivered a short paper explaining the principles and advantages of the C.B. system. Officers of the Electrical and Traffic Departments then conducted groups of the members through the testroom and switchroom and explained the various pieces of apparatus. The visit of inspection aroused considerable interest and was much enjoyed.

THE following office bearers have been appointed to carry through the work of the telephone society for session 1910-11.—President, Mr. J. K. Thyne; vice-president, Mr. T. Pettigrew; secretary, Mr. J. K. Murray; treasurer, Mr. G. Dewar; librarian, Mr. A. C. Thomson. A strong committee has also been appointed representative of the various departments and of the out-centres. It was arranged that the society meet once a month for six months. Intimation was received that the splendid accommodation provided for the society at the Technical College during the past session was likely to be still further improved upon next session, a specially equipped lecture hall with adjacent committee room in the new part of the building having been placed at the disposal of scientific societies by the college authorities.

THE third meeting of the Operators' Society and Club was brought to a close on the evening of March 24, when prize essay competition papers were submitted by the members. The papers contributed by Misses Dickson and MacConnochie were awarded first and second prizes respectively, and consolation prizes were awarded to Messrs. Kelly and Petrie and to Miss Murray. Misses Dickson and MacConnochie read their papers to the meeting and were awarded a hearty vote of thanks. The sixth meeting of the "Club" took the form of a "Song tea," the winners in the competition being Misses J. Drennan, B. Reid and I. Brunton. In addition to this a sketch, a musical programme and dancing contributed to what proved a very pleasant evening.

THE Whist Club brought the season to a close with a whist drive, held on Friday, April 1, when a most enjoyable evening was spent. Miss Jamieson, Fees Clerk, and Mr. B. D. Heberton, Rental Register Department, were the prize winners. The manner in which the season's arrangements have been carried out reflects great credit on Mr. A. C. Thomson, the energetic secretary.

THE annual business meeting of the National Telephone Bowling Club was held in the engineers' office on the evening of April 6, when the office bearers were appointed for the ensuing season.

THE Golf Club's March Medal Competition resulted in a victory for Mr. H. Thomson. As he had already qualified, however, Mr. J. P. Hamilton was returned the winner. The spring meeting of the club has been fixed for April 23 when play will take place under medal conditions for three prizes. Negotiations for a golf match between the East and West of Scotland districts are being entered into. As yet nothing has been definitely arranged but the match will probably take place in June or July, and Hamilton has been proposed as the place of meeting.

WITH the advent of spring the members of the Office Swimming Club have resumed practice. The small pond in the Woodside Baths has been reserved, and, judging from the enthusiasm displayed at the first meeting, the season promises to be a successful one.

ARRANGEMENTS have been made to hold the annual picnic on Victoria Day, Thursday, May 19, and Callander will be the venue. The committee are to be congratulated on their choice of destination which is the centre of the most beautiful mountain and lake scenery in Scotland. Granted good weather, the excursion should be one of the most enjoyable ever held.

AMONG their multifarious duties, telephone men are not infrequently called upon to act as self-constituted officers of the Criminal Investigation Department, and an interesting case of this type occurred last month. A factor's clerk, engaged in the collection of rents, had his suspicions aroused by the actions of a man on the roof of a building in Summerfield Street, and as this man was using a Company's ladder the clerk communicated by telephone with our Bridgeton testroom. Faultsmen Macfee and Kelly took the matter in hand, and on arrival found that the suspect had left the ladder in a grocer's shop, with the intimation that he would call again in an hour. When he put in an appearance, however, he was grieved to find his return awaited with more than the usual interest, and immediately bolted. Our two heroes gave chase, and after doing 1,760 yards in their best style they succeeded in running their quarry to earth. At the police court on the following day the charge of stealing lead from the roof of the building was found "Not proven," but the prisoner was sentenced to 30 days for the theft of the ladder, which had been officially reported to the police a fortnight previously. The two principals now rejoice in the sobriquets of "Derek Clyde" and "Sexton Blake" respectively, and we congratulate them on their prowess.

WE regret to record the death of two members of the Glasgow staff during the past month. Stores Labourer Harry Brown, who had seven and a half years' service, died on March 10 as the result of heart trouble—he was quiet and obliging in manner, and in him we have lost a faithful and diligent worker. The Company has generously made a payment of £50 to Mrs. Brown. Contract Officer Miller died on March 20. He was transferred from the Post Office when the Company undertook the canvassing for both administrations over the whole area on March 1, but had not been well for some time. The sympathy of the staff is with those who now mourn their loss.

IT may interest our readers to know that the obituary notice relating to Fisher, Night Operator, at Kemp Town, Brighton, which appeared in last month's issue, has resulted in the receipt of a very kind letter from a lady in Belfast offering to do her best to obtain admission into a home for the children. Arrangements are, however, nearly complete for admitting the two youngest into Dr. Barnardo's Home, and it is hoped that it will not be necessary to accept the lady's kind offer. Thanks, however, are due to her for so promptly tendering her assistance.

## CORRESPONDENCE.

## EARTHING OF TELEPHONE BATTERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. Garner's letter *re* the earthing of the positive pole of main batteries, it has been found that when the positive is sent out to line the latter has a greater tendency to break down in insulation, and the conductor to corrode and waste away.

In fact, the action of the electrolytic cell is reproduced to some extent, *i.e.*, the line being positive represents the anode or wasting pole, the moist atmosphere the electrolyte, and the earth or common return being the cathode.

By joining negative to line the opposite effect takes place, *i.e.*, the wasting is confined to the common or earth connection, where it is not of much consequence.

I once came across a telephone exchange where the negative was earthed, and, being an automatic call system having the lines normally alive with 24 volts, the effect was disastrous.

Lines wasted away to needle points at the D.P. connections, and the subscriber's bell coils were continually becoming disconnected.

After reversing the polarity, all this trouble disappeared.

With regard to railway systems, Mr. Garner will thus see that the opposite of telephone practice is preferable (*i.e.*, making the line or supply rail *positive*), as it is more economical to renew and maintain than the running rails or permanent way.

Mr. Garner may have noticed that the supply rail is nearly always corroded and rusted, whereas the running rails remain quite bright.

Liverpool, April 4.

J. G. WHITTLE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REGARDING the letter from Mr. Garner in the April number of the JOURNAL. Perhaps the following paragraphs taken from page 257 of *Telegraphy* (Preece & Sivewright) may be of use.

"If an underground wire becomes earthy, owing to the insulating covering being partly removed, and the conductor being thus laid bare, it should be worked from the copper current from the battery. When the copper pole of the battery is joined to the wires, a salt of the metal forming the conductor is formed by the current at the point of leakage, and this being a non-conductor, the insulation of the wires is improved. This, however, can only be done for a time, for the metal is gradually transformed into its salt, and communication is eventually broken down entirely.

"The action of the zinc current is the reverse of this; by depositing metallic copper its effect is to clean the wire, and thus to increase the leakage. For this reason the zinc currents should invariably be used in testing covered wires, for leakages will be brought to light by it which, with the copper current, would in all likelihood escape notice."

Nelson, April 13.

TOM HARGREAVES, Inspector.

## RE CAPITAL AND REVENUE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. E. Parkinson's letter in the March issue of the JOURNAL, headed "Capital and Revenue," without the context it is impossible to know the exact sense in which the authorities he quotes contend that labour is or is not "capital," and, very likely, in no case would there be any analogy with the Company's views or methods on the subject of the allocation of expenditure. Perhaps, however, the following illustration may assist Mr. Parkinson to form an opinion. Supposing he, being possessed of £2,000 (his capital), proposes to convert his cash into a house and to receive rent instead of dividends, clearly the value of the house when built still represents his capital, and the value of the house can only be arrived at by the cost of building it, and the cost of building it necessarily includes labour as well as material.

London, April 5.

"EQUITABLE."

## DEVELOPMENT STUDY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. E. L. PRESTON, in the Correspondence columns of the April number of the JOURNAL, invites suggestions for improvements or additions of value to the system which he describes for recording the number of working circuits at distributing poles in Bristol. The subject is an important one, and it would be interesting and no doubt serviceable to have the views and experiences of engineers and others concerned with such records.

It is difficult to criticise such a system as Mr. Preston describes without a knowledge of the circumstances and organisation under which it works, and I venture to think Mr. Preston has lost sight of this fact and also that Mr. Taylor, obviously with intent, does not deal fully with the engineers' side of the question when he condemns the London contract card from an engineer's point of view. Quite contrary to Mr. Preston's statement that to his mind the London card does not meet requirements from a contract manager's point of view, Mr. Taylor on enquiry informs me most emphatically that the card fulfils all his requirements.

It is stated that the Bristol card has proved indispensable, and that the system has not been found wanting. Six separate entries for every alteration to the number of working circuits on a D.P. and a similar number in some cases where no such alteration occurs seem particularly useless and costly, and, to refer to Mr. Taylor's misquotation of Sam Weller, seem also to savour of "the taste and fancy of the doer." Items Nos. 1 and 2 mentioned in the fifth paragraph of Mr. Preston's letter are quite unnecessary, but item 3 is obviously indispensable. The information given on the Bristol card, with the single exception of that provided for in the last column, seems quite valueless, both from a contract and an engineering standpoint. From an economical point of view the system appears to be decidedly wanting.

When something more is required than the development record already provided for on testroom record card No. 2 (Schedule No. 1,340), which the Bristol system seems to ignore, the card here reproduced may be recommended.

The card provides for monthly entries of the number of working circuits for a period of four years. The necessary monthly or other periodic revision may be conveniently made by reference to the testroom record cards. At the

Exchange .....					
D.P. No. ....			D.P. Address .....		
No. of Pairs in Cable					
No. of Pairs connected to Exch.					
No. of Pairs faulty					
Remarks					

Entries to be made as at the 1<sup>st</sup> of each Month

No. of Working Circuits					
Month	1908	1909	1910	1911	
1					
2					
3					
4					
5					

top are given details of the D.P. with columns for alteration, if the capacity of the cable is affected, and an ample space for remarks. The back of the card might be squared for a graphical representation of the development, or decrease in available spares if desirable. The number of available circuits, the figure required by the Contract Department, may be obtained by subtracting the total working circuits from the number of pairs connected to exchange, due allowance being of course made for faulty circuits and circuits which must be reserved for service and other purposes, particulars of which should be entered in the remarks columns.

Salisbury House, April 15.

F. G. C. BALDWIN.

## STANDARD EXPRESSIONS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MISS VAN RIEL's letter in the April issue on the above subject raises some interesting points. In the main I quite agree with the writer, but take exception to some of the suggested alterations.

"Sorry called you in error," and suggested expression "I am sorry it is a mistake." The first mentioned is a standard expression, as in "T.2," but is not "Mistake, I am sorry you have been troubled" more suitable?

"Sorry, I don't know; there is no one on your line now." Miss Van Riel seems to think that it is not always applicable. It has been found that in the majority of cases this expression has proved satisfactory. As to the suggested expression, "I will enquire"; if the operator says this and makes the necessary enquiries among the other operators it considerably delays the work and burdens the operators unnecessarily; for it is seldom that an operator remembers, especially at a sub-exchange worked by order wire, where this expression is mostly in use. It is therefore almost impossible to find out.

"If I want you I will ring again." This sounds somewhat flippant, and almost implies that the operator knows that she has been ringing them unnecessarily. The writer appears to think it unnecessary to tell a subscriber that there is no one on his line, for if there were he would speak to them. I disagree and would instance the following example:—"Trunk" makes a call to a sub-exchange, where trunks are received on a ringing junction, and keeps the called number waiting five or ten minutes, which is a common occurrence. The called subscriber will then ring and the operator on answering is challenged with "Are you wanting me, Central?" She then replies "Yes, trunk are wanting you."

The writer also states that the reply is not always suitable and gives this example: "A subscriber rings up, and says: 'Well! what do you want?' It is absurd to reply 'I am sorry, I don't know, there is no one on your line now.' An operator seldom realises that the subscriber is making the remarks to her, and she will invariably answer the call with "Number please," which is often met with the reply, "Is anybody wanting me, for you have just been ringing?"

The expression "Have you got them?" certainly requires modifying, would not "Have they answered?" meet the case better. "Have they replied?" is



somewhat difficult to say, and "Hæc jū hād thēm?" implies "Have you finished?"

There is another expression in "T.2" which might be commented upon, "What exchange, please?" (when a subscriber omits to give in the name of the exchange when asking for a number); this is not so suitable as "Which exchange, please?" "What" can be pronounced in a variety of ways, some of which are of a very bad form and undesirable for a telephone expression, but for "which" there is only one pronunciation. But apart from this "which" is the better word for a telephone expression. I should like some further comments on the suggestions made.

*A few suggestions on the repeating of numbers:*

As we are all aware, numbers repeated over the telephone are separated, with few exceptions, into units. These exceptions are the even hundreds and thousands and numbers in which the same figures occur twice or more in succession. This practice has no doubt in many instances resulted in the elimination of errors. It is nevertheless doubtful how the even hundreds after 100 should be repeated; for instance, 1000 is an even hundred. Should it be repeated "One, nine hundred?" Would not "One, nine, double oh" be more clearly understood? for unless an operator is very distinct in repeating the "one" the subscriber hears "nine hundred" only which causes him to repeat the number again and in some cases to ring, thinking the operator is connecting him to nine hundred instead of one, nine hundred.

Sheffield, April 18.

"TRAFFIC."

### NEWS OF THE STAFF.

Mr. A. R. LAMB has been appointed District Manager to the new West of Scotland district (combining the old Greenock and Dumbarton districts) with headquarters at Greenock.

Mr. W. MITCHELSON, District Manager at Dumbarton, has been appointed Contract Manager for the combined district.

Mr. E. E. STOCKENS, District Manager, Aberdeen, was presented by the staff with a silver tea and coffee service to signalise the completion of 25 years' service. The presentation was made by the Contract Manager (Mr. T. Mackenzie). Mr. Archibald Clow presided at the gathering, and Mr. Douglas Watson paid tribute to Mr. Stockens' work in the district.

Mr. W. A. TAYLOR, Local Office Clerk, Cheltenham, was, on his transfer to Bristol district office, presented by the Gloucester and Cheltenham staffs with a leather trunk and a Gladstone bag. On March 18 a farewell whist drive and social gathering were held at Cheltenham.

Mr. D'AUTHREAU, Local Engineer, North, was presented with a tassel as a token of esteem by the staff of the North-West district on his being transferred to a similar position at London Wall. The presentation was made by Mr. J. A. Hunt, Divisional Engineer, and took place at the North Local Office.

Mr. LEONARD PRICE, Engineer, Leicester, has been transferred to the Engineer-in-Chief's staff.

Mr. T. ELLIOT, Chief Clerk, Galashiels, Border district, has been made the recipient of a handsome gold watch and Albert from friends and members of the Gala Rugby Football Club in recognition of his valuable services on the football field. Mr. Elliot has played more than once for Scotland the summit of a footballer's ambition.

Miss MARY LOYN, Operator, Cardiff, has been promoted to fill the additional position of Supervisor authorised on the opening of the new exchange.

Miss GRACE PATTERSON, Operator, Argyle Exchange, Glasgow, left for Canada on March 24 and was presented with a gold bangle by the Argyle staff.

Miss MARY BRACKENRIDGE on being transferred from Crosshill to Argyle Exchange, Glasgow, was presented by the Crosshill operators with an ebony-backed hair brush and comb bearing her initials in silver.

Instrument Fitter DUNCAN PROUDFOOT was transferred to Scarborough from Glasgow and presented by his friends with a kit bag and a case of brushes in token of their esteem.

Switchboard Fitter THOMAS CANNING left for South Africa on April 14 and Test Clerk WILLIAM MAXEY left for Canada on April 28. Both these members of the Glasgow staff carry with them the best of good wishes for their future success.

Cable Joiner A. BUTLER, of York, has left the Company's service and is going out to America. He was presented with a kit bag by the York staff on his departure.

Mr. D. PILKINGTON, Sub Engineer, Dundee, has been transferred to Ayr as Inspector-in-Charge.

Mr. W. H. NEWCOMBE, District Office Clerk, Exeter, was transferred to Neath on April 4. Before his departure Mr. Reid, the District Manager, on behalf of the Exeter staff, presented him with a fountain pen and shaving set with razors.

Mr. A. CARWITHEN, Learner, Plymouth, resigned on March 31 to go to Canada. Before leaving he was presented with a Gladstone bag by the staff with their best wishes for his future.

Mr. H. MASON, of the Portsmouth district office staff, was presented with a cabin trunk, on March 19, on the occasion of his leaving the Company's service to take up a position at Las Palmas. He was liked by all who knew him, and was a zealous worker, taking great interest in his duties. He carried with him all good wishes for his future welfare. Mr. S. J. Smith, District Manager, made the presentation.

Mr. H. C. HAMILTON, of the Portsmouth district office, was on April 8 presented with a travelling bag and pipe, on the occasion of his transfer to the General Superintendent's staff, as a token of appreciation by the staff. The presentation was made by Mr. F. E. Collins, Chief Clerk.

Mr. DONALD REID, Inspector, Banff, has been appointed to Buckie, vice Mr. W. C. Stuart, resigned.

Mr. JONAH ROGERS, Learner, Elgin, has been appointed Inspector at Banff, vice Inspector Reid transferred to Buckie.

Mr. ROBERT GAULD, Aberdeen (Apprentice), has been transferred as Inspector at Plymouth. Before leaving Aberdeen Mr. Gauld was presented with a travelling bag and set of razors by the Aberdeen staff.

Mr. PERCY G. DREW, Night Operator, Chatham, has been transferred to the position of Inspector.

Mr. ALBERT ERNEST KYLAND, has been appointed Exchange Manager, Cardiff, in succession to Mr. W. J. Marsh recently promoted to Traffic Manager for the Cardiff district. He joined the Company's service at Cheltenham as an apprentice in September, 1899, was transferred to Stroud as Inspector, and was finally transferred to Cardiff as Exchange Manager in-training in April, 1909.

Mr. ADAM WATT, recently transferred from Edinburgh to Belfast, was entertained at a smoker on March 25 by the Edinburgh staff. During the evening Mr. John Robertson, Electrician, presented him on their behalf with a marble clock.

Mr. ALEXANDER F. DUNN, Cost Clerk at Edinburgh, has been presented with a set of Scott's novels and a Waterman fountain pen by the Edinburgh Telephone Thrift Club, of which he is treasurer. Miss A. St. Clair Johnson made the presentation.

Mr. STEPHEN R. MCKENNA, Foreman Joiner at Edinburgh, has been transferred to be Instrument Inspector at Belfast. The staff at Edinburgh presented him with a gold watch. The Engineer made the presentation.

Miss AGNES M. LOUDEN, lately Operator at Edinburgh Central, has been presented with a silver-backed brush and comb and a vanity bag.

### Metropolitan Staff Changes.

The following promotions and transfers have been made:—

Mr. F. BURROUGHS, Divisional Fitter, North-East, to be Fitting Inspector, City.

Mr. D. MALTBY, Fault Clerk, Croydon, to be Instrument Inspector, Bromley.

Mr. S. HARVEY, Inspector, West, to be Fault Clerk, Croydon.

Mr. A. W. BRISTOW, Chief Clerk, Divisional Engineer's Office, West, to similar position South.

Mr. A. AMBROSE, Chief Clerk, Divisional Engineer's Office, South-East, to similar position West.

Mr. L. J. COOPER, Chief Clerk, Divisional Engineer's Office, South, to similar position South-East.

Mr. J. C. CREE, Clerk, Divisional Engineer's Office, North-West, to be Local Engineer's Clerk, Streatham.

Mr. P. H. POOLEY, Local Engineer's Clerk, Streatham, to be Local Engineer's Clerk, Lee Green.

Mr. W. HOOD, Local Engineer's Clerk, Lee Green, to be Local Engineer's Clerk, Redhill.

Mr. W. HALL, Local Engineer's Clerk, Redhill, to be Clerk, Statistical Office, Salisbury House.

Mr. J. B. SCOTT, Clerk, Statistical Office, Salisbury House, to be Clerk, Divisional Engineer's Office, North-West.

Mr. E. WELCH, Assistant Storekeeper, Gerrard, to be Storekeeper, East Ham.

Mr. A. S. R. MACFARLANE, Divisional Construction Electrician, North-East, to be Local Engineer, Walthamstow.

Mr. E. A. GILBERT, Divisional Construction Electrician's Clerk, Gerrard, to be Divisional Engineer's Clerk, South-East.

Mr. C. F. BENNETT, Inspector, London Wall, to be Test Clerk, Gerrard.

Mr. T. MITCHELL, Inspector, Avenue, to be Assistant Engineer, Streatham.

Mr. G. H. COLE, Divisional Maintenance Electrician's Clerk, South-East, to be Clerk in Metropolitan Electrician's Office.

Mr. F. C. MUIR, Clerk in Metropolitan Electrician's Office, to be Divisional Maintenance Electrician's Clerk, South-East.

Mr. H. R. PAYNE, Call Office Collector, Cashier's Department, to be Contract Officer, North-East.

Mr. N. J. FRENCH, Clerk in Statistical Office, to be Clerk in Construction Department, Gerrard.

Mr. E. GRAY, Clerk, Divisional Engineer's Office, Gerrard, transferred to Paddington.

### London Traffic Department.

Miss CAROLINE WEST, Senior Supervisor-in-Charge, Walthamstow, transferred to a similar position at Ilford.

Miss ELVIRA COWLEY, Supervisor, Avenue, promoted to be Supervisor-in-Charge, Walthamstow.

Miss MABEL SHEARING, Operator, East, promoted to be Supervisor, Avenue.

Miss MAUDE CLAYTON, Operator, London Wall; Miss FLORENCE WRIGHT, Operator, Paddington; Miss VERA RIX, Operator, Westminster; and Miss AGNES HASLTON, Operator, Kensington, promoted to be Supervisors at Gerrard Exchange.

Miss JEAN MITCHELL, Supervisor, Holborn; Miss THERESA CASEY, Supervisor, Avenue; Miss FLORENCE DINGLE, Supervisor, Kensington; and Miss ETHEL BRAND, Supervisor, Bank, transferred to similar positions at London Wall.

Miss CHARLOTTE JEFFERIES, Operator, Gerrard, promoted to be Supervisor, Avenue.

Miss EVA MELDRUM, Operator, Avenue, promoted to be Supervisor, Bank.

Miss BERTHA BROTHERWOOD, Operator, East, promoted to be Supervisor, Holborn.

Miss JESSIE MOORE, on her transfer from Bank to be Senior Supervisor-in-Charge at Stratford, was presented with a "week-end" bag as a token of esteem from her colleagues.

## MARRIAGES.

Miss MAUD B. GLADMAN, who had been in the Company's service in Brighton for fourteen years, and latterly had been Clerk-in-Charge of the Kemp Town Exchange, was married at St. Luke's, Brighton, on Easter Day. A number of the staff were present at the ceremony, including Miss Trott (Clerk-in-Charge, Brighton Exchange), and Messrs. L. Parsons (Chief Clerk and Churchwarden), J. H. Watkins (of the Engineer-in-Chief's Department), and H. Hine; a goodly number of operators from the various exchanges also being present. The presents were numerous and included a dinner service and Chippendale flower stand from the Brighton staff.

Miss CHARLOTTE PALMER, Operator, Cardiff, left the Company's service on March 24 in view of her approaching marriage. The operating staff presented her with an electro-plated dinner cruet as a mark of respect, and with best wishes for her future welfare.

Mr. A. SKEVINGTON, Faultsman, Watford, who was married to Miss D. LEWIS, Operator at the Rickmansworth Exchange, on April 9, was presented with a marble clock.

Mr. CYRIL BURTON, who was in the Company's service at Folkestone for about two years, and left to take up similar employment in Winnipeg, Canada, was married there on March 21. Those of the staff who were acquainted with Mr. Burton extend him their good wishes for his happiness.

Mr. A. V. HIGGINSON, Cabinet Maker, was presented by the Cabinet Department, Nottingham Factory, with a handsome set of fish carvers and a dinner service on the occasion of his marriage at Easter.

Mr. W. BENNETT, Nottingham Factory, was the recipient of a handsome curb from members of the Cabinet Department on the occasion of his wedding.

## OBITUARY.

We regret to record the death of Mr. THOMAS WOODHOUSE, Assistant Engineer, Blackburn, which took place on Tuesday, April 12. His end was painfully sudden as he worked as usual on Saturday, April 9. On the evening of the same day, however, he became very ill, and as the symptoms were serious he was removed to the East Lancashire Infirmary, Blackburn, on Monday, but died on Tuesday, after an operation. The funeral took place on Saturday, April 16, and, despite most deplorable weather conditions, rain falling in torrents, all the time, was attended by nearly 50 members of the staff, amongst whom were the Engineer, Chief Electrician, Contract Manager, and Chief Clerk. The outside and inside staffs each sent wreaths, while one was also sent by the Burnley staff. Mr. Woodhouse entered the service in 1883 as firepot boy and won his way to Assistant Engineer by sheer merit. He was a quiet, unassuming man, and was much respected by all the staff, who keenly feel his loss.

We regret also to record the death at the early age of 27 years of Miss KATHLEEN KELLY, which occurred on March 13. She entered the service on March 13, 1906, as the Electrician's Typist, Manchester, but owing to ill-health she was unable to follow her employment from April, 1909. As a token of esteem a floral tribute was subscribed for and sent by the members of the various staffs.

On March 4 died of double pneumonia Mr. EDWARD CHARLES WATTS, of the Stationery Department, Head Office, which he entered in October, 1901. He had been absent from the office since Jan. 8, and died in the Lady Margaret Hospital, Bromley, on the day stated. His colleagues expressed their regard by a wreath.

## LOCAL TELEPHONE SOCIETIES.

**Birmingham**—The last meeting of the present session was held on April 5, when a paper was read by Mr. R. Dolman of the Electrician's Department, entitled "C.B. Working, Subscribers' Equipment, Modified and Otherwise." A large number of slides were shown and a good discussion followed.

**Blackburn**—The last meeting of the session was held on April 8, when the following six ten-minutes' competitive papers were read by junior members of the Blackburn district staff:—Airey, T., Inspector Blackburn, "Maintenance in Relation to Traffic." H. Jinks, C.O. Attendant, Burnley, "Method of Recording Faults." G. E. Mitchell, Inspector, "Operating." F. Parkinson, Firepot-Boy, Blackburn, "Duties of a Firepot-Boy." E. A. Riley, Clerk, Blackburn, "Primary and Secondary Cells." J. H. Taylor, Inspector, Burnley, "Education of the Subscriber." Three prizes were offered and as a result of the voting of members as to which were the best and most useful papers, the first prize was won by F. Parkinson, H. Jinks winning the second and T. Airey the third. It was unanimously agreed that the subjects selected by these younger members of the society were of high class and intelligently treated. Mr. R. Shepherd, past president of the society, who very generously provided the prize money, was present and opened the proceedings with a few very appropriate and encouraging remarks.

**Bolton**—On March 17, Mr. W. Bockock, Inspector, Bolton, read a paper intended for competition, entitled "Power Plant, Notes on Economy in Installation and Maintenance." The design of power leads and use of retardation coils in prevention of overheating were some of the points raised and discussed.

**Brighton**—A meeting was held on March 31, when an extremely interesting paper on "Detail—its Use and Abuse" was read by Mr. D. Wallace (Contract Manager). Besides being most useful in its suggestions, the paper was also a notable literary production and provoked a lengthy discussion after delivery. Mr. C. F. Moorhouse (District Manager) presided over a large attendance.

At a meeting held on April 11, a highly interesting lecture on "Maintenance" was given by Mr. H. Hatton (Chief Inspector). Practically all branches of maintenance were touched upon, and the lecture was illustrated by diagrams. There was a good attendance, and the chair was taken by Mr. F. W. Roberts, Local Manager. After the lecture, a protracted discussion on the various points raised took place.

**Cheltenham**—The ninth and last meeting of the session was held on March 30, the president (Mr. C. Elliott) being in the chair. Mr. R. A. Dalzell, Provincial Superintendent, was present together with fifteen members and two

guests. Miss F. H. Davenport gave a very interesting and instructive paper dealing with "Operating Expressions," and "Traffic," illustrated by a number of original curves.

**Cork**—A meeting was held on March 10 when Mr. J. Roy, Chief Inspector, read a most interesting and instructive paper entitled "Construction and Maintenance of Battery Calling System," and illustrated it by diagrams. The subject was very ably dealt with. A discussion followed and was taken part in by the District Manager (Mr. Kidd), Mr. A. Lynn, president, and Mr. H. Hayes.

Another interesting paper, entitled "Ticket Recording," was read by Miss Fitzpatrick, Travelling Supervisor, on March 31, Mr. Lynn in the chair. The speaker showed a thorough knowledge of the subject, and after a friendly discussion, taken part in by the manager, the chairman, and Miss Gallagher, the proceedings came to a close.

**Dublin**—On March 16 a paper on "Routine Testing" was read by Mr. G. Kirkwood, Exchange Inspector. The subject was most ably treated, the methods of making the various tests being discussed. A general discussion followed.

Mr. G. Sutcliffe, Sub-Engineer, gave a very interesting paper, entitled "Transmission," at the eighth meeting of the session held on April 6. The various transmission formulae were lucidly explained and evoked considerable discussion.

**Dundee**—The April meeting was held on April 12, Mr. W. Brown presided. A paper lent by Mr. J. Forrester, Glasgow, "Transmission of Power," was read.

**East Kent**—This society's sixth meeting for the session was held in the district offices. Dover, on March 22, when two papers were read—(1) by Mr. H. J. Corke (Local Manager, Folkestone), on "Some Operating Points;" (2) by Mr. J. Allen (Foreman, Folkestone), on "Overhead and Underground Construction." There was a good attendance of members, and discussion was freely indulged in.

**Exeter**—The final meeting of the session was held on March 23, Mr. H. Reid, District Manager in the chair. A paper was read by the president of the society, Mr. R. A. Dalzell on "Traffic and the Value of the Telephone Call as varied by the Degree of Efficiency of each Individual Member of the District Staff." There was a good attendance; the paper was most instructive, and an animated discussion followed.

**Torquay**—The last meeting of the session was held on April 4, when Mr. G. F. Brough read a paper, "Among the Wires at Home and Abroad." The different methods of carrying out work in America, Canada and Great Britain were described. A description also was given of the erection of a 600-mile telegraph line from Oakland to Oregon, U.S.A. A good discussion followed.

**Gloucester**—The seventh and final meeting of the session was held on April 7. The chair was occupied by Mr. C. Elliott, District Manager. A very excellent and most interesting paper was given by Mr. A. Berry, Inspector-in-Charge, Lydney, entitled "Methods of and Material Used in Construction," illustrated by lantern slides, manipulated by H. G. Henderson (electrical staff). A profitable discussion was indulged in by Messrs. A. D. Pike (Local Manager, Cheltenham), F. W. Seats, J. L. de Medewe and G. A. Greenland. This being the final meeting of the session, a vote of thanks was recorded to Mr. C. Elliott, District Manager, for the kind interest he has taken in the society, and valuable information afforded at each of the meetings for the welfare of the members of the staff.

**Hull**—The sixth meeting of the East Yorkshire Telephone Society was held on March 31, when papers were read by Mr. T. P. Steel, "Reproduction of Sound," and Mr. A. C. Mayman, "Storage Batteries," who secured the first and second prizes respectively in the local competition recently held. The papers were much appreciated by the members of the society.

**Leeds**—Four papers occupied the attention of the meeting held on March 30. "Progress of Telephony," by Mr. P. S. Neiman; "Traffic Improvement from a Cost Point of View," by Mr. F. S. McGraw; "Notes on Building Materials," by Mr. W. E. Walker; "Training of a Telephone Man," by Mr. H. Mortimer.

**Leicester**—The last meeting of the session, held on April 15, was taken up by Mr. John Ashton, who read an interesting and highly instructive paper on "Simple Methods of Gaining Knowledge," which was much appreciated by the members present, of whom 47 per cent. attended. The president (Mr. M. Marsden) occupied the chair.

**Liverpool and Birkenhead Operators**—The fourth meeting was held on March 8. Miss E. M. Jones was in the chair. Papers were read by Miss Melville, of the Central Exchange, and Miss Hufton, Anfield Exchange, the subject chosen being "Automatic Boxes." Following these Miss Dreaper and Miss Burns each gave a paper on "Private Branch Exchanges," and being themselves private branch exchange operators, the points raised were interesting and brought forth a good discussion. The discussion with regard to automatic box working was also well maintained. During the latter portion of the evening several musical items were rendered.

The fifth and final meeting was held on April 12, Miss E. M. Jones presiding. The evening was set apart for the competition papers to be read. Prizes were offered for the two best papers, which it was required should be sent in under *noms de plume*. The prize winners were Miss F. Kerridge, Bank Exchange, the subject of whose paper was "Supervision," and Miss Annie Walker, Central Exchange, who selected "Some Causes for Slow Allotment" for her paper. A short musical programme terminated the proceedings, which were thoroughly enjoyed by all present.

**Luton**—At the meeting held on April 11 Mr. R. B. Lester gave a paper on "Magnets in Telephony." An interesting discussion followed.

**Manchester**—At a general meeting on March 18 the following were elected as officers for the session 1910-11:—Past presidents: R. H. Claxton, A. Magnall, G. S. Wallace; hon. presidents: R. Shepherd, F. W. Taylor; president, W. Cleary; vice-president, G. F. Staite; hon. secretary, E. Sawyer; hon. treasurer, J. Hayward.

**Newcastle**—The seventh and last meeting was held on April 5, Mr. J.

Gwyther, president, being in the chair. The annual general meeting was the first business, and following the minutes of last meeting, secretary and treasurer's reports were read, the election of officers were dealt with, and the officers for next session are as follows:—Hon. president, A. L. E. Drummund; president, J. P. Urwin; vice-presidents, R. W. Jackson, E. T. Payne, J. Gwyther; hon. secretary and treasurer, F. W. Gaskins. The first paper was given by Mr. F. W. Gaskins on "Telephone Engineering." Considerable interest was taken in the samples of apparatus which were passed round after being described. Amongst the apparatus of particular interest was a piece of D.C. cable which is believed to be the first laid in England, and also a piece of 8-wire 40-lb. conductor G.P. cable laid in C.I. split pipe by Post Office for telegraph switching system in Newcastle before telephones were in use. A second paper was to have been given by Mr. J. Gwyther but time did not permit.

**Nottingham.**—The seventh meeting was held on March 18. The subject of the paper read by Mr. A. C. Morris, Electrician and Traffic Manager, was "Traffic," which was illustrated by various slides showing magneto and C.B. switchboards and curves of junction and local traffic statistics. The paper produced a discussion in which thirteen members took part.

On April 11, Mr. P. R. Cockrem, Cost Clerk, read his paper on "Telephone Administration: How it is Organised." A number of slides were shown which illustrated among other things the staffs of each department in the district, staff diagram, diagram showing routine of measured rate works order in operation, and so forth.

A discussion took place at the close of the paper, during which nine members and visitors took part.

**Nottingham Factory.**—The last meeting of the session was held on April 11, when Mr. J. W. Hambleton of the Engineer-in-Chief's Department, Nottingham Factory, gave a paper on "The Solid Back Transmitter and the Transmission Testing of Telephone Apparatus," illustrated by slides and demonstrated by the actual working apparatus. Discussion followed, in which the necessity for the elimination of the human element in testing was recognised, and the design of the apparatus subjected to criticism.

**Northampton.**—A meeting was held in the inspector's room at the Northampton Exchange on April 5, with Mr. W. Dickinson in the chair. The following papers were given and a discussion of a general character followed each paper. "Operating," by Miss H. Crombie; "Faults," by Mr. C. Robinson.

**North-East (London).**—The monthly meeting of this society was held on March 31 in engineer's general office, Dalston Exchange, Kingsland Green, N.E. Mr. D. Morley-Ward (the president) was in the chair. A paper entitled "Outside Work" read by Mr. M. B. Stephens, Assistant Engineer, Dalston, was very interesting to the members who were present and was followed by a keen discussion.

**Oldham.**—A very interesting paper was given by Mr. Croasdale, of the Ashton-under-Lyne staff, on Feb. 24 last. Mr. Croasdale took for his subject "Leaves from an Inspector's Notebook," and the various matters dealt with were of much interest to the staff present.

**Paisley.**—The seventh and concluding meeting of the session was held in Hutton's Restaurant on April 8, Mr. R. Audsley, president, presiding. This was the annual business meeting, when the reports of the past session were reviewed. The treasurer's reports showed a deficit balance of 9s. 9½d. The present committee were re-elected *en bloc*. This, the first session of the society has been very successful, and it is to be hoped that next year's may be more so. The evening was given to a social gathering, which took the form of a whist drive. The game was enjoyed by everyone present, and when the scores were counted it was found that the prizes were won by the Misses Thomson and Messrs. Thomson and Stewart.

**Plymouth.**—On March 16 Mr. S. R. Harris gave a paper entitled "Line Faults." The subject gave plenty of scope for discussion, in which many of those present took part; 67 per cent. of the members were present.

On April 6 a meeting was held when two papers were read, the first by Miss M. C. Jinkin, Travelling Supervisor, entitled "Supervising Sub-Exchanges." The second paper was by Mr. S. G. Tregillus, Stores' Clerk, on "Stores." Both subjects were ably dealt with and a lively discussion was carried on; 60 per cent. of the members were present.

**Portsmouth.**—The telephone society brought a very successful session to a close at the general meeting held on March 31, when prizes were awarded to the following for papers read at the society's meetings: First prize, Mr. S. Wainscot, "Atmospheric Electricity and Wireless Telegraphy;" second prize, Mr. T. Collins, "Electrical Units;" third prize, Mr. S. J. Pharo, "Electrophone Transmission."

**Sheffield Operators.**—The second meeting of the above was held on April 8, when a very interesting and instructive paper entitled "Order Wire Working," was read by Miss Ridal before a fair number of the operating staff. The reading was followed by considerable discussion.

**Sheffield.**—On April 8 the annual business meeting in connection with the above was held. There was a good attendance. This meeting was for the purpose of electing officers for the ensuing session, the following being elected:—Hon. presidents, Messrs. G. Franklin, A. Coleman and R. C. Bennett; president, Mr. W. Thyne; vice-presidents, Messrs. F. Barr, E. J. Johnson, and A. Broomhead; hon. secretary, Mr. D. Thomson; hon. treasurer, Mr. H. Stokes.

**Sunderland and Shields.**—The sixth monthly meeting of this society was held on April 1 at Sunderland; Mr. E. Spink presided. A paper on "Cable Testing" was given by Mr. Allen Livingstone. Discussion was followed by Messrs. E. Spink, J. G. Dixon, R. Scott and J. Martin.

**Tunbridge Wells.**—The fourth meeting of the session was held on Feb. 22, when Mr. R. Aitken lectured on "Aerial Lead-Covered Cables." With the aid of lantern slides, Mr. Aitken explained the methods of arriving at the comparative costs of aerial and underground cables, and also showed the various phases of the actual erection and the methods to be employed.

The fifth meeting of the 1909-10 session was held at the Dudley Institute on April 6, when Mr. Whibley lectured on "Coils." With the aid of diagrams

Mr. Whibley explained the various kinds of coils as applied to the Company's apparatus. Interesting experiments were also shown with a 10-inch sparking coil and vacuum tubes.

**Western (Metropolitan).**—The monthly meeting of this society was held on March 31, on which occasion Mr. G. F. Greenham (Metropolitan Electrician) read a paper entitled "Some Modern Maintenance Methods." There was a large attendance to hear what proved to be a very interesting lecture. Lantern slides were shown giving various circuits and statistics.

**Wolverhampton.**—The postponed March meeting took place on April 1 at the Midland Café, under the chairmanship of Mr. E. J. Jarrett, Local Manager. An interesting paper was read by Mr. R. S. Grosvenor, late Local Manager of Walsall on "Wayleaves," illustrated by curves and sketches. There was a good attendance, numbering 55 members, and numerous questions were asked at the close and satisfactorily answered.

## STAFF GATHERINGS AND SPORTS.

**Aberdeen.**—Under the auspices of the cricket club the annual concert and dance was held in St. Margaret's Hall, Gallowgate, on April 6. In the absence of Mr. Stockens, District Manager, Mr. Thomas Mackenzie, Contract Manager, occupied the chair. An excellent musical programme was gone through and Miss Arthur played the accompaniments admirably. After the singing of "Auld Lang Syne" the hall was cleared and dancing was engaged in till twelve o'clock.

**Birmingham.**—On March 19 another football match took place, this time between the Engineer's and Electrician's Departments. Miss Hart, Supervisor, Midland Exchange, kicked off. The Electricians scored the only goal before half-time. On resuming the Engineers registered three goals in quick succession, and although the Electricians made strenuous efforts to recover the lost ground they could only reduce the lead by one goal, which was scored just before the call of time, the Engineers winning a very creditable game by three goals to two. There was a good attendance of the staff.

**Bristol.**—The annual football match, Office v. Instrument Staff, under Association rules, took place on Durdham Downs on April 9. The game was closely contested and resulted in a draw, one goal being scored for each side. Unfortunately F. J. Head, left back for the Office Staff, sustained an injury to his thigh before the conclusion of the match, so that the match terminated as a consequence a few minutes before time.

**Edinburgh.**—*Amateur Golf Club.*—The special spring competition was played off on Gorebridge on April 9. Owing to the inclement weather only fourteen members of the club took part. The match was a hole-and-hole against bogey for two prizes presented to the club and two presented by the club. The winners were: First, Mr. William P. Knox, Electrical Staff; second, Mr. R. B. Rae, Assistant Engineer; third, Mr. Arch. Pagan, learner; fourth, Messrs. William Fraser, General Office, and Alfred Robson, Electrical Staff.

**London.**—The third annual soiree was held by the Kensington Exchange staff at the Fulham Town Hall on April 9, and was attended by upwards of 150. The proceedings, organised by Miss Neller the Clerk-in-Charge, were of a highly enjoyable character. Miss Neller was admirably supported by Mr. H. C. Parker as M.C., Messrs. C. W. Naughtin, C. Knapman and J. Bool proving able stewards. Amongst those present were Mr. L. Harvey Lowe and the Exchange Manager. The entertainment consisted of dancing (music being supplied by Heinrich Hucks' band), songs and instrumental music by Misses E. Beverley, E. Barnard, E. Hayden, A.R.C.M., and Mr. Wm. Lott. A sketch entitled "Confession" was splendidly executed by Miss Lilian Eston and Mr. Collier Ground. A most enjoyable evening was spent by all present.

**Oldham.**—A football match was played under Association rules on March 19 between the Oldham and Ashton-under-Lyne staffs at Ashton-under-Lyne. The game resulted in a fine victory for the Oldham men by four goals to one, and was keen throughout. After the match an adjournment was made to the Stamford Café, where the visiting team were entertained to a substantial tea. This was followed by a smoker and a musical evening, the party dissolving at about 10.30 p.m. after having had a most enjoyable and entertaining time.

**Portsmouth.**—The Portsmouth staff held their first whist drive and social evening of the season on April 1 at the Masonic Hall, Lake Road. The gathering was a great success, quite 200 being present. Winners of prizes for the whist drive were: Ladies: first, Miss Cairns; second, Mrs. Harding. Gentlemen: first, Mr. P. Copeland; second, Mr. J. Gifford. After the presentation of the prizes the remainder of the evening was devoted to an enjoyable dance programme, interpolated with songs, music and a recitation. The duties of M.C. were ably carried out by Mr. Bennett, and he and Mr. S. J. Smith were responsible for the general organisation of the gathering. The prizes were presented by Mrs. S. J. Smith.

**Stirling.**—A social meeting in connection with the local telephone society was held in the Waverley Hotel on the evening of April 1. Mr. Edmond, District Manager and president of the society, occupied the chair, and there was a large turn-out of the members and their friends. During the evening a most enjoyable programme of songs and other music was gone through, and prizes were presented to the lady members of the society who had read papers during the session. The gathering which was the first of the kind held in the district, was thoroughly enjoyed by all present.

**Swansea.**—A smoking concert was held at the Adelphi Hotel on April 15 in connection with the local telephone society. The chair was occupied by Mr. W. E. Gauntlett (District Manager), supported by the heads of the departments. An excellent musical programme was gone through which was greatly appreciated. During the evening prizes were awarded Messrs. R. A. Skinner, A. Thompson, sen., D. E. Wilson, W. Caine and W. Davies, for papers read at meetings during the session. The staff and friends present numbered about 50, the company including Mr. W. Pennington, Post Office Sectional Engineer. The arrangements were satisfactorily carried out by Messrs. J. Radford, H. G. McArthur and C. A. Revan.



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## TELEPHONE MEN.

### XLIX—ROBERT GILMOUR.

ROBERT GILMOUR was born at Paisley in 1865 and educated at the public school in that town. He entered the telephone service at an early age in the dual capacity of "operator and office boy," which goes to show that the operating of those days did not engage the undivided attention it now receives. Shortly afterwards a new line was brought on to the switchboard in the shape of a trunk wire connecting Paisley with Glasgow which, being one of the first trunk wires opened by the Company, created something of a stir.

After nine months' stay in Paisley Mr. Gilmour was transferred to Glasgow, then under the management of Mr. D. Sinclair. An appointment as Exchange Inspector enabled him to get a fuller insight into exchange methods. During his stay in Glasgow Mr. Gilmour assisted in frequent changes of switchboard apparatus, taking part in the transfer of the central switchboard from Queen Street to the Royal Exchange building, and in fitting up the first multiple switchboard in Scotland. This board, which was supplied by the Western Electric Company, was far in advance of anything previously adopted and made an enormous difference in the service.

At the end of 1886 Mr. Gilmour was promoted to be Local Manager at Kilmarnock in the Ayrshire district, and after a further three years he was again promoted to be Superintendent of Sub-Exchanges South of the Forth, with headquarters in Glasgow. He remained in this position about a year when he was appointed District Manager at Aberdeen and had some experience of the call wire working with a flat board which obtained in that town.

On the reorganisation of the Company's system by the late General Manager, Mr. Gilmour was promoted to be District Manager at Dundee. The North of Scotland, which hitherto had been in Mr. J. D. Miller's charge was now placed under the control of Mr. F. D. Watson together with the rest of Scotland. Negotiations with the Dundee Town Council for underground facilities were in progress during Mr. Gilmour's stay in that town, but

before a decision had been arrived at he was transferred to the District Managership of Ulster under Mr. Gill in March, 1896. At this time the Ulster district had just recovered from a very exceptional snowstorm, which broke down the whole system and put many lines out of use for weeks. The subscribers more severely affected were trying to force compensation from the

Company, so that among Mr. Gilmour's first duties in Ireland was that of meeting, along with the members of the local board, a deputation from the subscribers to hear their grievances, and after some discussion matters were arranged. The service was then single circuit overhead, but the Company, after completing the necessary agreement for underground facilities with the Corporation, changed its system to underground metallic circuiting, having at the same time secured a suitable site for a new building. The change in due course was carried out with satisfactory results. Mr. Gilmour installed the first central battery switchboard in Ireland, that of Londonderry, the system being also changed from overhead to underground.

In July, 1909, Mr. Gilmour was transferred as District Manager to Edinburgh under the superintendentship of Mr. F. D. Watson, which position he now holds.

On more than one occasion there were negotiations with the Belfast Corporation, and these were rendered much easier by reason of the esteem in which Mr. Gilmour was held by the members of the Corporation and by the city officials.

Cautious and attentive he won a high place in the minds of the subscribers, while his loyalty, zeal and ability to

organise a large staff so as to make a district work efficiently and smoothly, cause him to be highly regarded by those who have been in contact with him.

We much regret that for some time recently Mr. Gilmour has not enjoyed the best of health, and we feel that the unanimous wish of all who know him is for his speedy restoration to health and strength.



## THEORY v. PRACTICE IN CONTRACT WORK.

By C. S. LIVEMORE, *London.*

As a reader of the JOURNAL it has occurred to me that a short article on contract work in London might not be out of place. I have chosen the above for a title not from a pessimistic view but to try and help others who at present are quite ignorant of the working of contract officers in London. It has often been stated, and is still being asked by some departments, "Of what use is the Contract Department and its staff?" What a question! Where would all the other members of the Company be without such a department? Has it not built up the whole concern and, as the last balance sheet shows, is still building. May it continue!

We have had several well-written articles on contract work, which mostly apply to the provinces, and in them the main factor appears to be theory; but in London (by which I mean the City area), this factor does not govern, for it is nearly impossible to carry out our work on theoretical lines, and the contract officer is left to work from the practical side. I doubt whether there is any other centre in England, Ireland or Scotland, that comprises such a number of general trades and various businesses as London, so that the rule applying to the one, is quite inapplicable to the other, as can easily be proved.

Theory tells us to take a certain street, canvass the whole, card all non subscribers, and educate them up to placing an order with the Company; it must increase business, etc., etc.

Practice shows one-third of the street already connected on the telephone, one-third warehousemen, one-third agents; the business of the two last mentioned is to come into contact with each other not by telephone but in person, for goods are to be carried and inspected before buying transactions can take place.

Another street consists of either stockbrokers or jobbers. Of the former, practice will show that all of any standing are already connected, and of the latter a large percentage are here to-day and gone to-morrow.

The occupants of another street are mostly of the merchant or shipbroker type. With the former, one often finds that it is hard to make both ends meet, or that business does not warrant the cost of the telephone. Of the latter type a very large percentage are subscribers.

Another section of the community are the bankers, who will often have their branches connected with the telephone for the special benefit of head office information, but not for public use, as transactions are not accepted by voice alone.

Again, there is the solicitor, who ignores the telephone because by letter or interview he charges his well-known 6s. 8d., whereas for communication by telephone his client often repudiates the charge.

One provincial article states that the public will not to any great extent come into the Contract Department, so that theory demands that the contract officer should go to the public. How little this state of things obtains in the City of London, where one of the very first things a man starting in business does—and practice proves it—is to seek out the rates for installing the telephone, and the contract officer following up the enquiry, can always by easy methods secure the order.

There is one branch that theory overlooks, and that is the grand system of auxiliary canvass, and to my mind this is a great point where the practical contract officer in London shines in all his glory. The work, patience and perseverance in following up suggestions are well worth mentioning, for at times theory has been shown the door, but practice well handled has gained the order.

## BOLTON DISTRICT BENEVOLENT SOCIETY.

This society is in a very flourishing condition. According to its balance sheet its receipts during the year were £49 13s. 8d., and after deducting all expenses, the payment of £9 9s. in grants to infirmities and the payment of £18 9s. during the past year in grants to members of the staff requiring assistance, it has a balance in hand of £17 8s. 10d.

## THE TELEPHONE LOAD LINE.\*

By H. DEANE, *Assistant Traffic Manager, London.*

This subject is particularly interesting from many points of view. From a telephone standpoint it is, to begin with, of considerable antiquity. In comparison other branches of traffic work are of recent origin. For instance, the systematic observation of service is a new development. The training and education of the operator have only been scientifically understood and carried out of late years. All the fascinating studies connected with junction working are quite of recent origin. The telephone load line, on the other hand, like the poor, has always been with us. It existed long before a Traffic Department was thought of. When, a few years ago, a person enquired what was meant by traffic, and of what it consisted, the answer he obtained was, "Well, there's the load line — —"; but the enquirer could obtain no further information.

The telephone load line should be a subject interesting to all, because it is one of the oldest of records; it existed before the days of specialisation. Even those who are ignorant of traffic matters in general knew something of the load line. Then, again, so far as the traffic engineer is concerned, it is a subject of the greatest importance, and which presents many problems of interest.

The load line is a curve record which represents the telephone traffic at an exchange during a certain period. It has three distinct uses. By its means we are enabled to determine whether the operating staff is sufficient; we are able to arrange the duties of an operating staff to the best advantage; and from it we obtain the necessary particulars in order to estimate for future switchboard equipment.

Before dealing in detail with the uses of the load line, I should like to consider several questions. The first question that suggests itself is this: At what times of the year should this record be taken? Before we can answer this question we ought to know the causes that govern the variation of telephone traffic. These are three in number. To begin with, we have variations caused by the seasons of the year. The effect of the season upon traffic is, in London, a very regular thing. A glance at curve No. 1 shows this variation very clearly. The curve represents the calling rate per direct exchange line during each week in 1909 at those C.B. exchanges fitted with registers; and, as the principal exchanges are involved, the curve may be looked upon as representative of the London traffic.

Secondly, additional lines are constantly being added to the system, and these naturally increase the bulk of the traffic. Thirdly, the use of the telephone among existing subscribers is constantly increasing. To a great extent this is dependent upon the extension of the system. The larger the telephone system becomes, the greater is the inducement to use the telephone. But suppose the system were not increasing; even then we should expect an increasing calling rate on account of the extended use of the telephone among the existing subscribers. When we notice, therefore, that the calling rate of the principal services is increasing, we must attribute it to a combination of the causes I have specified.

Now, in order to ascertain at what times of the year the load line should be taken, we should consult curve No. 1. It is clear, I think, that this represents the traffic variations due to the seasons and the extended use of the telephone. Our object is to ascertain what times of the year are representative of the traffic. Once we have ascertained this point, the principal object of taking more than one load line at an exchange is to deal with the changes brought about by the increase of the system.

If the load line is not taken at representative times of the year, so far as season variations are concerned, we run the risk of taking worthless records. We also unnecessarily complicate the excellent principle of estimating the operating staff in advance, because, under such conditions, we have to estimate not only what traffic there will be at a particular time because the season has changed, but also what effect additional lines will create.

\* Abridged from paper read before the London Telephone Society (Traffic branch).

Some traffic men think that the times of the year when a load line should be taken should be near the average line shown in curve No. 1. If the variations of traffic due to the seasons were small throughout the year this would be a safe policy to adopt. But our curve shows that this is not the case. It is, of course, true that some of these variations are directly due to the Bank Holidays. The decrease of traffic at such times may be considered as artificially lowering the average line. If we mentally eliminate these effects, however, we shall find that there are two occasions during the year when the curve rises considerably above the average line. I refer to the periods from about the end of February till the end of July and from the end of September until the end of the year. I feel confident that if, during these periods, we employed an operating staff based on the average weekly traffic we should, during a considerable portion of such periods, be incommoded to such an extent that the same standard of service could not be maintained. It becomes a question how much higher than the average we should go. I have specially marked on curve No. 1 the weeks during which the load line is taken, and it will be seen at the side what relation the traffic during these weeks bears to that during an average week.

Suppose, now, we eliminate the effects of the Easter and Whitsun holidays by drawing the dotted lines shown and take the average traffic during all the weeks above the average line. We obtain a higher average line, which, in my opinion, should indicate when the load lines should be taken.

If we work on this principle, we shall find that it will not be convenient to take the load line at regular intervals as at present; and this brings me to my second point. Having ascertained at what time of the year we should take the load line, how many times during the year should the load line be taken? This will naturally depend upon the use to which we put the record. We must chiefly be guided, I think, by the growth of exchanges. If the development is very great it might be worth while to take a load line at frequent intervals. Where there is little or no development we might rest satisfied with a load line taken once and for all, so long as we are certain that it was taken during a representative time of the year.

Having determined how often it pays us to take the load line, and if we should take it at some exchanges oftener than at others, it becomes a question on which day of the week this record should be taken. There can be little doubt that this day must be representative. By this, I mean that it should either be an average day if the traffic variations are not excessive or the average of at least three busy days if these are considerably busier than the remaining days. Exchange managers should be guided by the figures included in table A which shows the relation between each full working day and the average day. Such figures should be obtained for each exchange, and the load line should be taken on that day in each case, which approximates to the conditions I have specified.

TABLE A.

RELATIVE VALUE OF THE DAYS OF THE WEEK FROM AN ORIGINATING TRAFFIC STANDPOINT: FROM A RECORD TAKEN AT ALL EXCHANGES FITTED WITH REGISTERS IN LONDON DURING THE WEEK ENDING FEB. 13, 1910.

Monday	..	..	..	..	98
Tuesday	..	..	..	..	100
Wednesday	..	..	..	..	101
Thursday	..	..	..	..	93
Friday	..	..	..	..	102
Average full working weekday	..	..	..	..	100 (taken as the unit)
Saturday	..	..	..	..	65
Sunday	..	..	..	..	68

Then we have to consider this point. Should the load line be taken for the whole 24 hours, or for twelve hours, or during two distinct periods corresponding to the times when the day and night staffs are on duty? From one point of view a record taken for 24 hours is very necessary, especially at those exchanges where the night traffic is considerable. The traffic engineer often wants to know such items as the calling rate per direct line, the ratio of the day to the busy hour traffic, the percentage of junction calls and so forth, and undoubtedly such figures should be based on a record taken during 24 hours. On the other hand, when we wish to deal with such an important item as the day load of an operator, it is desirable to keep the work of the day and night staffs quite distinct.

Speaking generally, if we divide the day into two periods of twelve hours we also separate the work of the day and night staff.

The last question in this connection is this: Should the load line be taken in hourly or shorter periods? The advantages of dealing with hours instead of half-hours from an engineering point of view are well known. We get rid of traffic rushes and obtain a more reliable figure to work upon. But if we are dealing with the arrangement of operators' duties, it is more advantageous to consider the half-hour as the unit of time. A whole hour, especially in the morning, is too long a period to elapse before we bring additional staff on duty. Even were it possible not to consider this point in the morning the operators' hours of duty and the arrangement of their meal times would demand a shorter period than an hour as the unit. The half-hour is the usual period adopted.

We now come to the actual taking of the load line record at exchanges, and the first thing that suggests itself is what calls it is necessary to record. As far as the "A" operator is concerned the general practice of recording all calls which originate from subscribers, whether effective or ineffective, as well as those effected on the operators' initiative appears quite sound; although there are some who contend that since the ticket system was introduced this rule places the operator at a slight disadvantage compared with the work with which she was previously credited. It will be seen at once that some ineffective calls which previously originated from subscribers and which formed part of the record are now no longer made, because subscribers who pay by the call now depend upon the operators' promise to complete ineffective calls. It is better to keep the instruction as it stands, however, than to allow operators to record all the ineffective attempts they make to complete calls.

The present instruction to the "B" operator to record all connections, whether to subscribers' lines or to the engaged signal is also a sound rule as far as it goes. I am of opinion that the "B" operator should, in addition, be given credit for the junctions she changes when requested to do so by "A" operators. Our object should not be, as some suppose, to record at the incoming end what is recorded at the outgoing end, for a little reflection will show that this can never be accomplished; but rather to credit the "A" and the "B" operators with the operating they do.

The American practice of distinguishing between the calls which originate from the various services, although greatly complicating the record, has some advantages which appeal chiefly to the traffic engineer. These particulars, so helpful to him in design, are at present difficult to obtain with any degree of accuracy.

We have now to consider how the load line record should be taken by "A" and "B" operators. As far as originating traffic is concerned, we could choose between (1) a pad record, (2) a register record and (3) a peg record. As regards the first, our past experience goes to prove that it would be difficult to obtain a correct record. It would be very difficult to supervise such a record, and I may mention that the supervisor plays an important part in the taking of an accurate load line record. A register record, however alluring at first sight, does not give us what we want. We are unable to distinguish between local and junction calls, and it is impossible to read all the position registers at a given instant. A peg record appears to answer the purpose best. It is simple, it is easily supervised, and it is accurate. So associated has it become with the load line record that the latter is usually called "the peg count."

Although the peg record may be considered the best means of recording originating calls generally, it is possible that at small exchanges with no multiple or with a large amount of local working its advantages are not quite so obvious.

It would be possible to employ the call counter method to record originating calls; but the disadvantages are fairly obvious. Each operator would require two call counters in order to discriminate between local and junction calls; it would be difficult to read all the counters at a given instant; and the actual readings of the calls would be unnecessarily complicated.

These disadvantages to a certain extent exist in the recording of incoming calls where the call counter method is used; but here we have to consider whether a peg record would offer still further disadvantages. We must remember that at most exchanges the majority of incoming connections are made to the subscribers'



multiple, in a portion of which the recording pegs are inserted, and, if the peg method were employed to record incoming calls, the cords would be in the "B" operators' way. Again, a "B" operator, on the average, deals with more connections in a given time than an "A" operator, and, if she has to attend to a busy position, she may not have sufficient time to move a peg after each incoming connection. A call counter, which, under such conditions, may be held in the hand whilst an operator establishes connections, appears to answer the purpose best. Unless the operators, however, note the readings at the conclusion of each half-hour it is impossible for the supervisor to do this accurately by herself.

I have already referred to the accuracy of the peg count method, and it may be of interest to know that during the four load line records taken in 1909 at those exchanges fitted with registers there was only an average percentage error of .6. To put it more plainly, taking the register count as correct, the peg count was less than this by .6 per cent. Now that our system of registering calls is uniform we can directly compare the register and peg counts. In connection with this point, I am uncertain whether the peg recording of following on calls is quite appreciated.

I think it will be agreed that this degree of accuracy in taking the load line record is excellent, and reflects great credit upon the operators, the supervision and the management. The system of checking the accuracy of the peg count at particular positions during the record by means of the position registers is quite admirable, and should, in my opinion, be universally adopted.

Before we can represent the load line record in graphic form, we must investigate three important points. I refer to the valuation of calls, the operators' loads and the relation between an operator's efficiency and the positions she has to cover.

The time valuation of telephone calls is a subject to which, in my opinion, sufficient attention has not been given by the traffic expert, and I regret that the limited space at my disposal will prevent me from giving it that consideration which it deserves. During the early part of last year some work was done in connection with time values by the Metropolitan Traffic Department. The "A" operator's chief operations were separately observed at the two largest C.B. exchanges, and the average valuations of local and

junction calls were synthetically calculated. It was necessary to determine the destination of all junction calls in order to calculate the exact proportion of calls that required different amounts of supervision and so forth. Pay call office calls had to be separately valued, and the correct percentages of calls ineffective due to various reasons had to be considered. The complication was very great, and, when the time values had been ascertained, it was felt that they did not exactly represent working conditions. It will be readily understood that it is impossible to predict the amount of supervision necessary on any call, especially a junction call: and this is, as a matter of fact, the chief reason why theoretical calculations are at variance with actual practice.

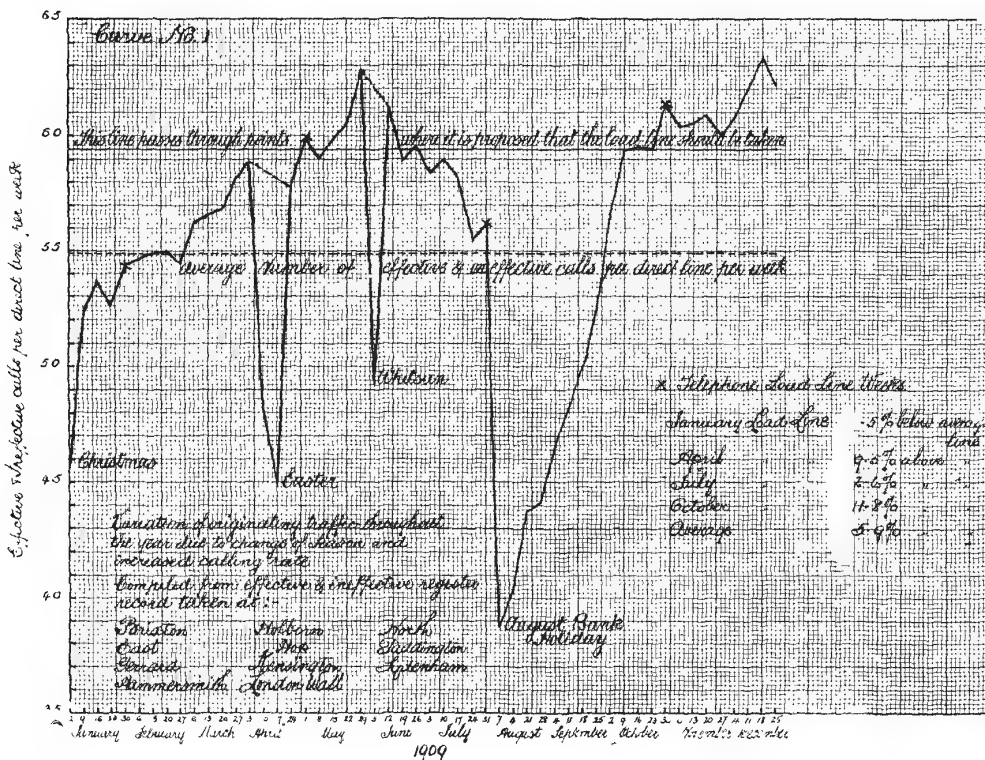
Lately this important study has been again considered, but on different lines. Our object has now been to determine exactly what is done under working conditions. It has been well observed that the amount of work which an operator does in connection with a call is dependent not only upon what she has to do, but also upon the time at her disposal. If an operator, at a given time, is slack, she will give extra supervision to her calls, supervision which she could not afford to give under other circumstances, and which, to a great extent, may be unnecessary. If the supervision of the operator and the observation of her work are on right lines, however, it will generally follow that what is done in practice is right; and it is on this assumption, which is considered reasonable, that the figures in table B are of value. The more observations made the more will the average time values increase in practical value.

TABLE B.

TIME VALUATIONS OF TELEPHONE CALLS FROM OBSERVATIONS TAKEN DURING JANUARY, 1910.

Exchange.	System.	Average time valuation of local calls.	Average time valuation of junction calls.	Average value of a junction call in terms of local calls.
London Wall..	C.B. (1)	11'36 seconds	16'12 seconds	1'41 seconds
Gerrard ..	"	11'38 "	16'41 "	1'44 "
Average ..	"	11'42 "	16'26 "	1'42 "
Avenue ..	Magneto (self-restoring indicators).	12'14 "	20'12 "	1'66 "

For the experiment average operators were observed at the exchanges shown. A stop watch was used which was cumulative



in its operation, so that the total time taken by a series of operations could be ascertained. The watch was started the moment the "A" operator took up an answering cord to answer a subscriber or the moment her hand moved towards the local jack if she happened to be anticipating the call. Immediately she went out of circuit to attend to other work the watch was stopped, and it was restarted on every occasion when she had to re-enter the circuit for whatever reason. A slight difficulty occurred when observing the time taken to clear the connection. This is sometimes an overlapping operation, and sometimes a connection is cleared by an adjacent operator. In order not to complicate the work of the observer, however, the time of clearing—namely, from the moment the "A" operator commenced to depress the register key at C.B. exchanges till she had finished guiding back the plugs into their sockets—was considered as a portion of the legitimate time value of the connection.

In order that such observations may be of the greatest value, a proportion of difficult calls, such as those that originate from pay call offices, should be included. The various kinds of ineffective calls should also be proportionally represented in the average time values. These conditions obtain

at exchanges in which the various services are distributed on each "A" position, and where a large number of observations has been carried out. The more we depart from an up-to-date C.B. exchange with distribution carried out on right lines the more we approach the sphere of the special position, and the more difficult it is to obtain representative observations. Everything possible has been done to overcome these difficulties in the special observations which have lately been carried out.

The figures in table B refer to the average time values of local and junction calls at the two principal C.B. exchanges and at the chief magneto exchange in London. The striking similarity between the time values at London Wall and Gerrard Exchanges will be noticed, and it will be seen that the average value of the junction call in terms of local calls is 1.42. The ratio at present in use, and which was calculated on theoretical lines some time ago, is 1.6 : 1. We use this same ratio for Avenue Exchange, but it will be seen that in this case the ratio in use is lower than it should be.

The average local call valuation is dependent not only upon the type of exchange under consideration, but also upon the size of the exchange and other causes. No one will deny that it takes less time to handle a local call at a C.B. exchange than at a magneto exchange, other things being equal. But it is quite possible for the time value of a local call at a C.B. exchange to be greater than that at a magneto exchange if the C.B. exchange is large compared with the magneto exchange. The local call time value depends a good deal upon the extent of the subscribers' multiple, the proportion of auxiliary lines, private branch exchange working, local change of numbers and so forth. The time value of the junction call depends upon the extent of the junction facilities, the way in which the outgoing junctions are arranged and marked and upon other reasons.

The question of whether the local call should be considered as the unit in London has often been raised. It is thought by some that the direct order wire call is a more constant unit. There is less variation, it is argued, in establishing a junction connection owing to the contraction of the outgoing junction multiple, and it being at the same level with respect to the operator than in establishing a local connection. The time of disconnection is also a more constant figure in the case of junction calls. What may be desirable for London, however, may not be so for the country as a whole. Besides, it may be contended that however desirable it is to employ a unit which is fairly constant, it is, after all, the average value of that unit with which we are concerned.

Two points must never be lost sight of in connection with these valuations. Not only must we know the time relation between the average local and junction call, but we must also know the actual time value of our unit, the local call. It is quite possible for the ratio between the local and junction call time value to be the same at two exchanges, and yet the unit at the one exchange to be considerably greater in value than that at the other exchange. The importance of this point will be more fully realised when we come to deal with the question of operators' loads.

It has already been remarked that the size of the exchange, as well as the type, affects the time value of local calls. The type of exchange must similarly affect the time value of junction calls; but there is no direct connection between such time value and the size of the exchange. At one time we used to vary our "junction valuations" as they are usually called, in proportion to the number of subscribers at different exchanges below a certain size. Now we employ a more logical method. We vary the junction call valuations in proportion to the junction facilities at different exchanges. Table C shows the figures we at present work upon. It will be seen that these valuations lie between 1.6 and 2.2. From a theoretical standpoint we were fairly satisfied with these limits at one time, although we were not quite so certain of the intermediate values given in table C, so much depending, of course, upon the actual time value of the local call. The figures have, however, given us something to work upon in the past, and they are under revision at the present moment. Standards we are not absolutely certain about are better than no standards at all; just as a bad government is better than no government at all—an opinion which was frequently expressed by Macaulay.

(To be continued.)

## TELEPHONE WOMEN.

### XLVIII.—HENRIETTA SPEARING.

HENRIETTA SPEARING, Clerk-in-Charge, Cardiff, entered the service in April, 1895, as an Operator at Paddington, and was subsequently appointed to be Supervisor at Gerrard Exchange in December, 1902. She was afterwards transferred to King's Cross and London North Exchanges, until in July, 1905, she was transferred to the London Training School. In May, 1907, she left the Training School for Gerrard Exchange as Supervisor, and in the early part of 1909 was made Travelling Supervisor for the City Exchanges.



HENRIETTA SPEARING.

Miss Spearing has only taken up her duties at Cardiff since May, 1909, but her exceptionally varied career has fitted her for taking charge of any exchange where it is necessary to control staff, and she knows how to keep the respect of the operators under her.

Cardiff Exchange has lately been transferred to common battery working in new premises adjoining the General Post Office, and Miss Spearing will now have an opportunity of using her large experience in training the operators at Cardiff in common battery working.

She has a pleasant manner in dealing with complaints, and has always been able to satisfy the subscribers, which is at times a matter of no small difficulty.

### XLIX.—MARION JAMIESON.

PAIRS and pairs of hands manipulating, with bewildering dexterity and no apparent object, a sea of papers—papers of all shapes and sizes, from tiny scraps to huge sheets. Such is the visitor's first impression of the Glasgow fees office, but a moment's stay reveals order in the seeming disorder, and the guiding spirit of it all is discovered in an unobtrusive figure seated at a small table. Thus do we meet the subject of our sketch,



Miss Marion Jamieson joined the staff in January, 1898. She was made one of the four clerks who prepared Post Office fee accounts under a supervisor, in a small room which now forms part of the "Royal" testroom. After a few months this work was put under the charge of the Post Office fee journal clerk, and the four girls were taken into the general office.

After a short experience, Miss Jamieson was made the senior of the four girls. It is of interest to note that during all these years, although the work must have been rapidly increasing, four clerks have continued to cope with it until quite recently, when, owing to the addition of junction calls, it became necessary to add a fifth.

When Miss Jamieson had been three or four years in the service she was put in charge of the Post Office fee journal. The



MARION JAMIESON.

practice continued of having a male clerk in charge of the sub-department, but he was at this point relieved of the journal work. Miss Jamieson's work whilst in charge of these journals was characterised by extreme neatness and unfailing accuracy. So marked were these qualities that audit clerks have referred to them specifically in reports.

In addition to the Post Office fee work, girls were employed upon the records in connection with limited services—measured, message, party message and omnibus—and as these services rapidly expanded a large staff was gradually built up. In the middle of the year 1907 the introduction of new measured tariffs and, simultaneously, of ticket-recording gave a further impetus to this work. When, therefore, at the end of that year, serious want of accommodation was found in the Glasgow office, and it became necessary to send out a section to fresh quarters, it was decided to send all the girl clerks, then numbering seventeen. They were consequently transferred as the "Fees Department" to a handsome and well-equipped office in the just-completed Anchor Line buildings. A supervisor was required to take complete charge of this branch, and the appointment was given to Miss Jamieson.

Since then expansion and re-organisation have been the order of the day. The new system of recording was introduced during the year 1909. Until its introduction the bookkeeping proper in connection with all these services had been carried out at the general offices, but at this point most of it was transferred to the Fees Department. Three of the Glasgow exchanges have been transferred from ticket to meter recording. The staff now numbers 24.



TRUNK FEE DEPARTMENT, GLASGOW.

Though previously inexperienced in control Miss Jamieson has skilfully guided her forces through the mazes of all the change and growth. Of quiet and unassuming disposition she possesses that happy knack of inspiring her assistants to loyal and enthusiastic effort. She is deservedly popular with her own staff and with all others who come into touch with her.

Miss Jamieson's favourite pastimes are cycling and reading, and while she pursues both with a good deal of enthusiasm she courts the sensational in neither. She enjoys a long spin and can cover a considerable distance in an afternoon when so inclined. She prefers the standard authors to those of the more modern school and has a particular preference for Dickens.

#### THE ANNUAL REPORT OF AMERICAN TELEPHONE AND TELEGRAPH COMPANY FOR THE YEAR 1909.

We quote the principal paragraphs dealing with the progress of the Bell system in the States:—

At the end of the year the number of stations which constituted the system in the United States was 5,142,692, an increase of 778,063; 1,508,790 of these were operated by local, co-operative and rural independent companies or associations having sub-license or connection contracts, so-called connecting companies.

The total mileage of wire in use for exchange and toll service was 10,480,026 miles, of which 649,308 were added during the year. These figures do not include the mileage of wire operated by connecting companies.

Including the traffic over the long-distance lines, but not including connecting companies, the daily average of toll connections was about 517,000, and of exchange connections about 19,925,000, as against corresponding figures in 1908 of 463,000 and 18,500,000; the total daily average for 1909 reaching 20,442,000, or at the rate of about 6,582,300,000 per year.

The amount added to plant and real estate by all the companies, excluding connecting companies, constituting the system in the United States during the year 1909 was:

For exchanges ... ..	\$20,958,700
For toll lines ... ..	6,316,100
For land and buildings ... ..	1,425,300
	<u>\$28,700,100</u>



## BELL SYSTEM IN THE UNITED STATES.

	Dec. 31, 1895.	Dec. 31, 1900.	Dec. 31, 1905.	Dec. 31, 1908.	Dec. 31, 1909.	Increase, 1909.
Miles of exchange pole lines ...	25,330	30,151	67,698	108,539	113,893	5,354
Miles of toll pole lines ...	5,873	101,087	145,535	161,452	164,111	2,659
Total miles of pole lines ...	78,203	131,538	213,233	269,991	278,004	8,013
Miles of underground wire ...	181,515	705,269	2,315,742	4,909,449	5,337,436	427,987
Miles of submarine wire ...	2,028	4,203	9,373	19,006	22,698	2,792
Miles of aerial wire ...	488,872	1,252,329	3,421,813	4,901,363	5,119,892	218,529
Total miles of wire ...	675,415	1,961,801	5,779,918	9,830,718	10,480,026	649,308
Miles of toll (trunk) wire ...	215,687	607,599	1,265,236	1,732,039	1,804,552	72,513
Miles of exchange wire ...	459,728	1,351,202	4,514,682	8,098,679	8,675,474	576,795
Total ...	675,415	1,961,801	5,779,918	9,830,718	10,480,026	649,308
Total exchange circuits ...	237,837	508,262	1,135,449	1,668,211	1,829,942	161,731
Number of exchanges...	1,613	2,775	4,532	5,043	4,968	75 <sup>1</sup>
Number of Bell stations ...	281,635	800,880	2,141,367	3,215,245	3,588,247	373,002
Number of Bell connected stations*..	27,807	55,031	287,348	1,149,384	1,554,445	405,061
Total stations ...	309,502	855,911	2,528,715	4,364,629	5,142,692	778,063
Number of employees ...	11,517	37,067	89,661	98,533	104,956	6,423
Number of connecting companies ...	...	...	...	7,721	10,354	2,633
Exchange connections daily ...	2,351,420	5,668,986	13,543,468	18,499,379	19,925,194	1,425,818
Toll connections daily...	51,123	148,528	368,033	463,021	517,341	54,320

\* Includes private line stations.

<sup>1</sup> Decrease.

The amount added in 1900 was \$31,619,100; in 1901, \$31,005,400; in 1902, \$37,336,500; in 1903, \$35,368,700; in 1904, \$33,436,700; in 1905, \$50,780,900; in 1906, \$79,366,900; in 1907, \$52,921,400; and in 1908, \$26,637,200, making the total expenditure for additions to plant during the ten years \$407,172,900.

During the year \$44,838,900 were applied out of revenue to maintenance and reconstruction purposes.

The total expenditure for maintenance and reconstruction charged against revenue for the last seven years was over \$231,500,000.

The charges against revenue for maintenance and reconstruction are no more than a conservative policy would dictate. It is necessary to make suitable provision for any change of plant and equipment required by the evolution and development of the business.

In the meantime the public is getting the benefit of the surplus and reserves without cost to it.

All that was said last year about the permanency of the plant could be re-said and emphasised this year. Steady improvement is being made in both plant and apparatus, but as the lines on which it is based are of a permanent character the process is one of evolution, not revolution. Careful comparative studies seem to warrant the statement that there is no one of the larger public service corporations that has a greater ratio of plant value to its outstanding obligations than has this company, nor has the plant of any other such company as great a ratio of realisable value to the book valuation.

Real estate, underground conduits, copper wire, cables of lead and copper, rights of way on private property—which represent such a large proportion of the company's assets—have a permanent value in the business and even a realisable value outside of the business which would be no mean asset.

There can be no boundaries to a telephone system as it is now understood and demanded. Every community is a centre from which the people desire communication in every direction, always with contiguous territory and often with distant points.

Every exchange must be the centre of the system.

The gross revenue collected from the public for telephone service by the Bell system—not including the connected independent companies—was \$150,000,000; an increase of nearly \$12,000,000 over last year. Of this, operation consumed \$50,000,000; taxes, \$7,000,000; current repairs and maintenance of property and provision for depreciation, \$45,000,000.

The surplus available for charges, etc., was \$48,400,000, of which \$10,220,000 was paid in interest, and \$24,000,000 paid out in dividends to the public.

The capital stock, funded and floating debts outstanding in the hands of the public at the close of the year were \$581,300,000. The surplus of liquid assets was \$57,200,000, leaving \$524,000,000 as the net obligations of all the system to the public.

Against these obligations, the companies had property \$612,600,000—an excess of \$88,600,000, or 17 per cent.

In addition, there is the intangible property, such as licenses, contracts, patents, rights of way, etc.—not including any public franchises—of great value, which it would now be difficult to obtain at any price.

In every case where the public authorities have appraised the plant of the companies, the valuation has been far in excess of the book valuation. It is within the bounds of conservatism to say that the obligations of all the companies outstanding in the hands of the public are represented by 150 per cent. of property at a fair replacement valuation of the plants and assets, *not including public franchises*.

The report makes the following observations on the Bell Company's policy:—

The Bell system was founded on the broad lines of "One System," "One Policy," "Universal Service," on the idea that no aggregation of isolated independent systems, not under common control, however well built or equipped, could give the public the service that the interdependent, intercommunicating, universal system could give.

This is no recent or new idea or theory. It is co-existent with

the business; in fact, the theory was evolved and developed before the business, and the business has been developed on that theory.

To develop the business it was first necessary to develop the "art." It was unique, nothing like it existed; the whole art of the practical application of electricity was new and undeveloped.

To develop the business to the best advantage all the best in the way of instrumentalities, apparatus and methods must be controlled. Apparatus and methods at the start were crude, but new instrumentalities and new methods were suggested from daily association, practice and study.

It was necessary to develop these, improve and reduce the useful to practice, and eliminate the worthless. For this purpose a staff of technical, electrical and mechanical operating experts must be gathered together and educated. To educate and assist these, to enable them to do intelligent work, avoid repetition and duplication, all that had gone before and all that was being done here and elsewhere must be known. For this purpose a bureau of research and information was formed. Patent and legal experts must be employed and educated to secure the advantage of this work and study, as well as to furnish protection in the use of the patents.

A highly developed manufacturing organisation under proper supervision and control was required to reduce to practical use these ideas and inventions, as well as to secure the standardisation and uniformity of instruments and apparatus.

To ascertain which were the best of the methods being evolved in field practice, to educate the others in the use of them, to assist generally in the development, and to bring about standardisation of operating practice and methods, a staff of travelling experts, observers and teachers was placed in the field.

It is necessary to the growing and constantly improving business that this work be continued. It is being done much more economically and far more effectively by this company than it could be done by the associated companies, and without expense to them except so far as it is covered by the mis-called "rental" of telephones.

The preliminary work was certainly difficult enough. Add to that the necessity of educating a doubting, hesitating public who looked on the invention as little better than a toy, and some idea of the task can be formed.

In the promotion and exploitation of the business two methods were possible.

*One company covering the whole country.* This would require a large executive and administrative staff in the field, and a large capital which, at the time, it was impossible to secure. Under this method, State organisations would also have been necessary to hold franchises.

*The other way was to enlist a large number of individual workers,* each with some capital, large faith and expectation, with great capacity for work, who would cover the field and develop the business.

To insure a common policy and central control, all licenses were issued for small units of territory under restricted terms, confining the business entirely within each territory. The parent company owned and furnished the telephones, had all reversionary interests or rights in the territory, and the right to connect the units with each other for the purpose of forming a universal intercommunicating telephone system. For this purpose the long-distance lines and other toll lines were built. Under these temporary licenses certain rentals, so-called, or royalties, were paid to the parent company for the use of the telephones and other inventions owned, and also as compensation for all the many other services rendered, as described above. When these licenses were made permanent and included all future as well as all existing inventions, and the right to the business within the units of territory, the parent company retained an interest in the business which was represented by a stock interest in each company.

These licenses called for a continued certain percentage of the stock of the company, but this right was soon waived by the parent company.

Through purchases to defeat the attempts of hostile interests to get possession of some of our associated companies, through the necessity of financing the companies for the purpose of keeping up with the demands for development, and through the purchase of its

*pro rata* of new issues, the American Telephone and Telegraph Company acquired its large holdings.

The book valuation of the American Telephone and Telegraph Company's interest in the share capital of the associated operating companies Dec. 31, 1909, was nearly \$306,000,000; of this only \$16,000,000 was received through contract or for licenses. The balance, \$290,000,000, was obtained under precisely the same conditions that shares have been received by the other shareholders.

As regards competition the report says:

There is not, nor can there be, any competition between these local associated operating companies, as under the conditions under which they can use the instruments and inventions, they must operate entirely within their respective territories; nor can there be competition in the telephone exchange systems operating in the same territory such as exists between other public utilities, certainly not such as exists between two gas companies or even between a gas and an electric light company.

The telephone system does not give you a "commodity" or a "product," or even a "service" except so far as it is service to make up a "path" or "line" or "highway" for personal communication with a party at some distant point.

The value of a telephone system is measured by the possibility of reaching through its connections *any one—at any possible place.*

There can be said to be no limit to those with whom one may desire communication at some one time or other. Ordinarily your communications are confined to a certain few other subscribers; occasionally you may wish to reach certain others, but there are times when it is an absolute necessity to get a connection with some one possibly unthought of or unknown before, and the importance of this connection may be vital.

A purely local exchange has a certain value.

If it has, in addition to its local connections, a connection with outlying contiguous localities, it has a largely increased value.

If it is universal in its connections and intercommunication, it is indispensable to all those whose social or business relations are more than purely local.

A telephone system which undertakes to meet the full requirements must cover with its exchanges and connecting lines the whole country. Any development which is comprehensive must cover some territory which is not, and may never become, profitable in itself but must be carried at the expense of the whole. *It must be a system that will afford communication with any one that may possibly be wanted, at any time.* To do this the system must offer a connection of some kind, and at such rates, as will correspond to the value of the system to each and every user.

"Interdependence," "intercommunication," "universality" cannot be had with isolated systems under independent control, however well connected. They require the standardisation of operating methods, plant facilities and equipment, and that complete harmony and co-operation of operating forces, that can only come through centralised or common control.

Wherever two systems exist, each has, with the exception of a percentage common to both, a different list of subscribers. Those of large and extended social or business connections must connect with both, while those who do not connect with both get only partial service—the same character of service offered by two street car lines, each having its tracks on and running through the principal main street of the town but each extending into and serving entirely different sections of the community.

Offering a connection with a so-called competing exchange, having a list of subscribers either entirely or largely different, is offering a different service, except so far as they connect the same subscribers, and there it is of no benefit, as either one would serve the purpose. Two exchanges, each with the same list of subscribers, cannot, in the nature of things, exist. One or the other would be unnecessary, because a subscriber would be paying twice for the same service when either exchange gave all that could be obtained from both. It would be like paying two fares each time you ride in a street car to maintain a parallel line, although you could ride in but one at a time. Competition of that character increases the cost to you. Competition is only of service when it reduces your cost or increases your service.

By reason of duplications—duplication of investment, duplication of operation—competition in telephone systems cannot, in the

nature of things, produce economy in operation, and without economy there can be no reduced charges.

With only one system, at once is eliminated the duplication of subscribers' lines—so also is eliminated the greater part of the unused and idle staff, equipment and plant, and with this are also eliminated capital investments, capital charges, operating salaries, plant maintenance and depreciation. That it contributes also to the comfort and convenience of the subscribers is in itself no small consideration.

No one can dispute the fact that the Bell methods and system are the standard and have been accepted as the best the world over.

Telephone rates have fluctuated. Beginning with simple and crude instrumentalities and methods, with small developments, the rates were low. As facilities increased, as methods and apparatus improved, and apparatus almost new and hardly in use had to be discarded to make place for new and improved methods, rates had to be increased.

In the New York City exchanges apparatus and plant practically good as new to the value of over eight and one half millions of dollars have been discarded because new improvements had made them obsolete, nearly all between the years 1883 and 1902, and the same is relatively true of any exchange system. As methods, plant and apparatus become more fixed and permanent, methods of operating improved, operating expenses declined, and reductions in rates followed—not because of competition.

### A FEW ECONOMIC PHASES OF THE MEASURED RATE.\*

By GEORGE HEY, *Contract Manager, Oldham.*

So much has been said and written in praise of the measured rate that it would be invidious on my part to add more, and I content myself with a frank and sincere expression of admiration on the equitable and commercial principles upon which it is based.

When these tariffs were generally adopted about three years ago throughout the various districts, the staff had to divest itself entirely of all its old ideas and practices, both in regard to securing new subscribers to the tariffs and in the supplying of telephone service under them. New principles and standards were given to govern all subsequent administration of the rates and control of the traffic which these tariffs gave rise to.

The new measured rate confirmed the equitable principle of the old message rate, which it superseded, but in the adoption of a graduated scale and other fundamental improvements, it extended the scope and range of telephone tariffs in order to meet, as well as to create, an increasing demand for telephone service.

As concerning the staff of the Company, a new era may be said to have dawned, which brought with it larger possibilities for development and the exercise of those extensive powers of organisation and adaptation which a rapid and extensive growth of business must call forth, and did, in practically every branch and department of the business.

The measured rate brought into great prominence two important and particular phases, which are the spirit and essence of the measured rate from an economic point of view.

*First.*—The telephone call under the measured rate was indelibly stamped as a commercial entity.

*Second.*—The telephone line, or "direct line" became possessed of a higher potential power as a revenue earner.

I wish to submit a few remarks bearing upon these two points, and some observations and deductions which suggest themselves as having a direct economic bearing thereon.

#### (I)—THE MEASURED RATE TELEPHONE CALL.

Under the new tariffs a definite rental is charged for the installation of the line, instrument and other plant, as the necessary and visible medium for the transmission of calls. A graded scale of charges is fixed, under which subscribers may purchase calls in proportion to their requirements.

From the period of the adoption of the measured rate the outward call upon such lines assumed a fixed and definite value,

and the transmission of such valued calls became of special pecuniary interest. The "valued call" became to the Company and the subscriber a commercial commodity which is designated "traffic." To all intents and purposes, the Telephone Company is engaged and employed in the conveyance or transmission of this traffic from one telephone station to another for its numerous customers, in the same way as a railway company, tramway company or any firm or corporation is employed and interested in the conveyance of traffic from place to place, where the "traffic" may be either in the form of human beings, live stock or merchandise. An increase in the traffic carried by a railway company means the employment to better economic advantage of its rolling stock, its stations, organised staff and affects the ratio of profit.

Increased or diminished traffic carried by the Company over its lines and between its numerous and various telephone stations has practically the same economic effect in increased or diminished earnings and profit.

The unit of traffic is the "valued call," and under the measured rate the valued call will, I believe, play an important part in the profitable development of the telephone business of the future.

The old flat rate, which was the principle tariff in operation up to 1907 for a direct line, in its application had no dividing line between the rental paid for apparatus and the service. For a fixed rental of, say, £10 (generally in the provinces) all the means was afforded for an unlimited number of calls being originated within a defined area or group of exchanges. The telephone call under that tariff was therefore of no fixed or definite value. The subscription covered not only the line, instrument and all essential plant, but the service also.

At that time, and under those conditions, the economic interest centred in the flat rate rental. Under the measured rate it is focussed in the traffic the line carries, or in the volume of valued calls originated on it.

The business tariff A starts at a minimum of 500 calls for £6, and is graded up to 4,600 calls per line at a charge of £15 12s.

The residential tariff B for originated calls begins at the minimum 300 calls for £5 up to 900 calls for £7.

It is in the flexibility of these tariffs that their greatest merit is found, and upon this their success during the past three years has rested. The tariff is adopted to meet the requirements alike of the large and small user.

This flexibility indicates the economic potentialities of the measured rate direct line. This is evident by a comparison with the now obsolete flat rate tariff. The measured rate line is capable of earning in calls during each year £11 12s. for 4,600 calls, which, added to the installation charge of £4, reaches £15 12s. The old flat rate was limited to a rental of £10 per annum, but without limit as to number of calls.

From the Company's point of view, therefore, it may be said that the prime object now in erecting telephone lines is to carry "traffic." The highest economic advantage, and that on which the Company's organisation rests and is based, is to employ these lines to their full carrying capacity. In such a consummation the Company would realise the fullest benefit upon its outlay.

The same argument applies to the subscriber. It is desirable that he should secure the greatest utility through the service upon his outlay. Every facility which can be put in his way to encourage and induce his increased use of the telephone, whether for inward or outward calls, is to the subscriber's advantage as well as to the Company's benefit.

But, unfortunately, these are ideals which are realised to only a very modified extent.

From some figures which I have been kindly supplied with this will be seen. The figures show the total number of outward calls originated by 100 measured rate subscribers during the entire rental year, under the business tariff A, and 100 measured rate subscribers under the residential tariff B.

These particulars were extracted from the records of this district in the order they appeared in the books, so as to procure a fairly representative statement of actual earnings.

Under tariff A (calls guaranteed, 500 per line):

52 made less than the guaranteed number of "calls," and the Company derived the minimum of £2 on each line only.

\* A paper read before the S.E. Lancashire Telephone Society.



48 exceeded the number of guaranteed calls, and the lines were thus more profitably employed.

Under tariff B (calls guaranteed 300 per line):

48 made less than the guaranteed number of calls, and the Company derived the minimum of £1 only on each line.

52 exceeded the guaranteed calls, and the lines were more profitably employed.

This summary causes one to reflect that after all in telephone traffic we are dealing with a peculiar commercial commodity. You will agree there is no given law which governs the incidence of the ebb and flow of telephone traffic. Some special event or circumstance in a given district, area or exchange may produce an impetus in a given desired rise in the traffic of a group of subscribers, and possibly there may be a corresponding inactivity in other channels which lead to a diminution of traffic, fully compensating for the rise, and leaving the net result the same.

By reason of the fact that each call now is a definite charge upon the measured rate subscriber, telephone traffic, as observable in the records, may not inaptly be termed "shy" and immobile, and this possibly to the same degree and extent as it was before abundantly active and extravagant, under the old flat rate.

The measured rate, however, has had a powerful effect in reducing the "engaged" call, as well as in reducing the number of redundant and frivolous calls.

From all these considerations it will be apparent that much responsibility rests with the traffic or operating staff for the careful registration of all effective calls upon measured rate lines. An intelligent interest taken in such duties is desirable from each operator, while a conscientious regard to the faithful carrying out of the regulations bearing on such recording is commendable and should be encouraged.

But, after all, as members of the staff, operators, clerks, inspectors, wiremen, contract officials and others, we may ask ourselves the question, in what way can we, or do we, affect the economic earning powers of a measured rate line? Our duties, mostly, do not admit of our conveniently inviting a subscriber to use his telephone oftener. The subscriber, in that respect, may be considered to be alive to its useful purposes and economic advantages in connection with his own business. We may, however, as opportunity offers, or as our especial duties direct, point out the advantages to a subscriber of increasing his facilities by providing himself with additional lines, or additional stations, for the reception, distribution or transmission of his calls. But in increasing the growth of traffic, or the sale of additional calls, the staff generally can do little.

The particular staff responsible for giving a good service appear especially to be in the position of helping to secure an increase of traffic, and it is universally conceded that a good service does conduce to that end.

(To be concluded.)

## TENSION AND SAG IN OPEN WIRES.

By J. F. COOTE, A.M.I.E.E., *Engineer-in-Chief's Department.*

THE tables for the tension and sag in open wires formerly published in the Company's Engineering Instructions were based upon the assumption that the wire is inelastic, and that changes of temperature are alone operative in causing alterations of length, with consequent alterations of stress and sag. The assumption thus made—that the elasticity of the material may be ignored—leads to very erroneous results in the calculated values, and in practice it has been found that wires erected in accordance with these tables are usually much too slack for good regulation. In consequence of this, foremen who carry out such work have come to run wires without regard to stress or temperature, except in so far as their experience guides them as to the tension to which they should be pulled up. Although this may give fairly good results in the hands of an experienced wireman, it is far from being a satisfactory method for general use.

It was in view of the recognised failure of those tables to meet practical conditions that the writer went into the question of the effect of elasticity upon the behaviour of open wires under varying

conditions of temperature, and calculated entirely new tables for 100-lb. hard-drawn copper and 40-lb. bronze wire—the two types of open wire most generally used by the Company—and, in addition, carried out a long series of observations, on wires specially erected for the purpose, to ascertain to what extent the old tables were erroneous in their representation of what actually occurs, and how far the new tables were in accordance with the facts of the case.

In an article on "Sags and Stresses in Overhead Wires" in the NATIONAL TELEPHONE JOURNAL, December, 1906, Mr. T. Fletcher referred to these calculations and experiments, and quoted two of the tables which I worked out. Mr. J. Poole also gives them in his *Telephone Handbook* (page 361), but as in both cases the matter is only briefly referred to, and as the subject is one which is of interest to all engineers who are responsible for this branch of the Company's work, it is proposed in the present article to deal rather fully with the subject, and, in order to make it as useful as possible, to show in detail how the necessary calculations to allow for elasticity may be made.

Before coming to these it may perhaps be best to consider briefly the old tables and the formulæ upon which they were based.

Let  $l$  = length of span in feet.

$L$  = " wire in the span in feet.

$W$  = weight of the wire in pounds per foot.

$\theta$  = change of temperature in degrees F.

$T_0$  = tension at the minimum temperature in pounds.

$T$  = " " higher " "

$D_0$  and  $D$  = the corresponding sags in feet.

$k$  = co-efficient of linear expansion per  $1^\circ$  F.

In constructing a table of tensions and sags, the minimum temperature and the factor of safety to be allowed at that temperature are first settled, and this factor of safety fixes the tension. Thus, in the case of a 100-lb. hard-drawn copper wire whose breaking load is 330 lbs. we may adopt a minimum temperature of, say,  $40^\circ$  F. and a factor of safety 3.

The tension  $T_0$  at the minimum temperature will therefore be

$$\frac{330}{3} = 110 \text{ lbs.}$$

Now a wire suspended between two fixed supports takes up a curve known as a catenary, and the tension and sag are related by the formula

$$D = \frac{wl^2}{8T} \dots \dots \dots (1)$$

Hence the sag corresponding to a span of 150 feet will be for a tension of 110 lbs.

$$D = \frac{0.01894 \times 150^2}{8 \times 110} = 0.48 \text{ feet.}$$

So that we have the values of the tension and sag at the minimum temperature. To find the corresponding values at any higher temperature the formula used in obtaining the old tables was

$$D = \sqrt{D_0^2 + 0.375 k \theta l^2} \dots \dots (2)$$

$k$  for hard-drawn copper being taken as 0.00000956, the sag for a rise of  $40^\circ$ , i.e., an actual temperature of  $60^\circ$ , will be

$$D = \sqrt{(0.48)^2 + 0.375 \times 0.00000956 \times 40 \times 150 \times 150} = 1.86 \text{ feet.}$$

Now from formula (1) it is seen that the tension in a wire varies inversely as the sag or

$$\frac{T}{T_0} = \frac{D_0}{D} \dots \dots \dots (3)$$

$$\text{and therefore } T = \frac{0.48}{1.86} \times 110 = 28.4 \text{ lbs.}$$

In a similar way the values of the tension and sag at any other temperature were obtained.

It will be noticed in formula (2) that there is no quantity dependent upon the elasticity of the wire, but only one depending on the temperature, and for this reason the values arrived at must necessarily be inaccurate.

The degree of inaccuracy will be at once seen, if we consider the case just taken. The change in tension found above for 60° is that due to the increase of length consequent upon the rise of temperature, and this increase is  $0.0000956 \times 40 = 0.0003824$  of the length of the wire. But did such a change of tension as from 110 to 28.4 lbs. occur from the effect of temperature alone, this very change would in virtue of the elasticity of the wire cause the wire to shorten up by an amount equal to  $0.00001146 (110 - 28.4) = 0.000935$  of its length, 0.00001146 being the co-efficient of elastic expansion per 1 lb. tension for a 100-lb. H.D. copper wire. The decrease of length would thus be more than twice the elongation produced by the rise of temperature. As a matter of fact, however, the tension never falls to 28.4 lbs., but as the temperature gradually rises and the wire lengthens the elasticity comes into play and shortens it, and the final tension for any given temperature is determined by the equilibrium of these two opposing forces. It will be seen later (Fig. 6) that in the particular case we are considering the tension would be, not 28.4 lbs., but 82 lbs., and the shortening of the wire is only 0.000321 of its length, which is slightly less than the expansion caused by the increase of temperature. From this it is obvious that, so far from elasticity being a negligible factor in the calculation, its effect is of the same order as that caused by an alteration in temperature, and it can therefore on no account be omitted from the calculations.

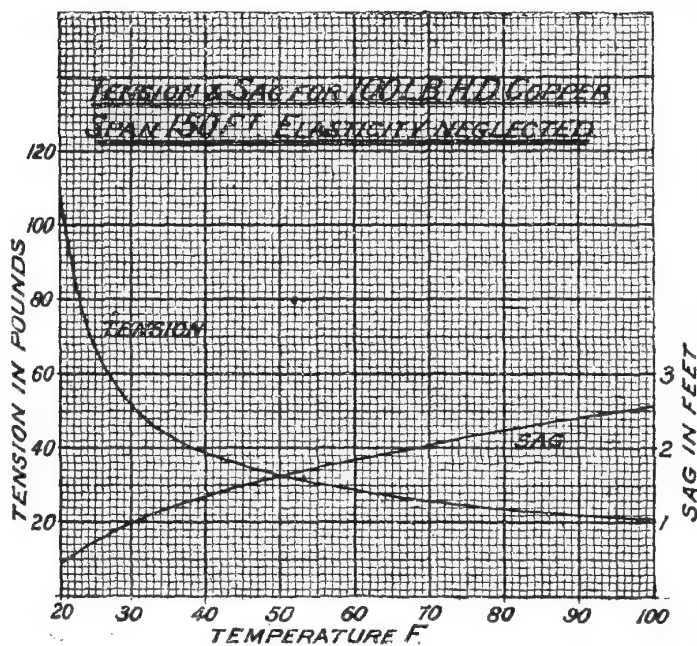


FIG. 1.

As a sample of the results obtained by the foregoing method, the tensions and sags for a 150-foot span of 100-lb. copper wire, taken from the old Engineering Instructions, are given in Table 1, together with the curves plotted from them (see Fig. 1).

The latter may be taken as characteristic of the general shape of the curves obtained when elasticity is ignored.

TABLE 1.  
100-lb. H.D. Copper. Span 150 feet.

Temp. F.	Tension (lbs.).	Sag (feet).	Temp. F.	Tension (lbs.).	Sag (feet).
20	110	0.48	70	26	2.07
30	52	1.02	80	24	2.25
40	39	1.35	90	22	2.42
50	33	1.63	100	21	2.58
60	29	1.85			

In this curve the very sudden change of tension between 20° and 40° should be particularly noticed, because it never occurs, and is exceedingly misleading.

We have now to consider a method of calculation, in which the elasticity of the wire is fully taken into account. Various methods have been given from time to time for doing this, and, of analytical ones, the simplest is perhaps that due to Prof. B. Hopkinson.

In this method it is necessary to start by assuming a series of sags, from which the corresponding tensions are at once obtained and then calculate out the corresponding temperatures. From these figures curves can be plotted, which give the values for any intermediate temperature.

Table 2 shows in detail the method of doing this, in the case of a 100-lb. hard-drawn copper wire, for a span length of 150 feet.

TABLE 2.

Sag (feet).	Tension (lbs.).	$\frac{L}{L_u}$	$\frac{L}{l}$	$\frac{L_u}{l}$	Expansion due to change of temp. $\theta^\circ$ .	Change of Temp. $6^\circ$ .	Actual temp. $t^\circ$ .
0.48	110	1.00126	1.0000277	0.99877	0.00000	0	20
0.54	98.3	1.00113	1.0000348	0.99891	0.00014	16.5	36.5
0.62	85.2	1.000976	1.0000463	0.99907	0.00030	35.3	55.3
0.71	75.2	1.000862	1.0000594	0.99920	0.00043	50.6	70.6
0.79	67.2	1.000770	1.0000743	0.99930	0.00053	62.4	82.4
0.88	60.9	1.000698	1.0000907	0.99939	0.00062	72.9	92.9
0.96	55.6	1.000637	1.0001087	0.99947	0.00070	82.4	102.4

Column 1 gives the assumed sags, the first of which is that for the given tension at the minimum temperature.

Column 2.—These are the tensions worked out from the sags in column 1, by formula (1).

Column 3 is obtained from column 2,  $\frac{L}{L_u}$  being the ratio of the actual length of the wire ( $L$ ) at temperature  $t^\circ$  to the unstretched length ( $L_u$ ) at the same temperature. It is equal to  $1.00001146 T$ .

Column 4 represents the ratio of the actual length of the wire ( $L$ ) at  $t^\circ$  to the span length ( $l$ ). It is equal to  $1 + \frac{8 D^2}{3 l^2}$ . This value is obtained from the geometry of the catenary.

Column 5 is the ratio of the unstretched length ( $L_u$ ) at  $t^\circ$  to the span length ( $l$ ), and is obtained by dividing column 4 by column 3. Instead of actually dividing, it is quite accurate enough to take this as equal to  $1 + (4\text{th col.} - 3\text{rd col.})$ .

Column 6 is the expansion due to an increase of temperature ( $\theta$ ), and is obtained by taking the value of column 5 for any temperature and subtracting from it the value at the minimum temperature.

Column 7 is the increase of temperature ( $\theta$ ) corresponding to any given expansion, and is obtained from column 6 by dividing it by 0.000085, the co-efficient of linear expansion per  $1^\circ \text{F}$ . This value of the co-efficient was specially determined for Prof. Hopkinson by Prof. Ewing.

Column 8 is obtained by adding the value of ( $\theta$ ) in column 7 to whatever temperature is selected as the minimum to be worked to, in this case 20° F.

(To be continued.)

#### THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY, LONDON.

The following grants have been made during April:—

Traffic Department (one)	£1 4 0
Engineers Department (four)	13 10 0
Stores Department (one)	5 10 0

Number of grants made since formation of society, 256; value £753 13s. 4d.  
Donations received: £15 10s. 8d. Number of members at April 30, 2,859.

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"BY THE STAFF FOR THE STAFF."

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JUNE, 1910.

[No. 51.]

## THE BELL TELEPHONE COMPANY'S REPORT.

ONCE again in reviewing the annual report of the American Telephone and Telegraph Company, we have to draw attention to the astounding figures both of development and expenditure which it exhibits. It is no new story, and the moral which adorns it is likewise by no means new, but unfortunately as regards Europe it has lost none of its force. What we said in 1906 might be said again with some variations in the figures quoted. One cannot help contrasting the one or two million pounds spent annually on telephone development in Germany for instance, or the £400,000 to £450,000 (as will be seen from another column) spent in France, or the expenditure of a million to a million and a quarter by our own Post Office, with the annual amounts of not less than five millions, and in some cases more than sixteen millions, laid out by the Bell Company on additions to plant. The annual increase in stations is not less amazing. The increase alone for 1909—viz., 778,063—is greater than the total number of telephones in Great Britain and Ireland, and Great Britain, it must be remembered, possesses more telephones than any country in Europe except Germany. One is accustomed to think of the United States as immeasurably more vast than any European country, but its population is only about 25 per cent. more than Germany's, and by no means twice that of the British Isles. Yet there are roughly 8,000,000 telephones in the United States and 600,000 in this country, a proportion of considerably over ten to one instead of less than two to one. It is not, therefore, entirely to the immense extent of the States that we must look for the explanation of the above-mentioned huge figures nor to the superior quickness of the Americans in appreciating and utilising facilities afforded by new inventions. The explanation lies rather, we think, in the steady development of the system by a far-sighted policy only practicable when there is a fair certainty of a long period of enjoyment and a commercial interest in results.

This policy is evidenced in the report in many ways, such as in the maintenance of a research organisation involving great

expenditure from which few results could be expected for years. The United Kingdom by its deliberate adoption of a limited term has short-sightedly deprived itself of just this very aid which painstaking and scientific research would have ensured for the future development of the industry. In fact, the whole history of the Bell Telephone Company, and indeed of the development of the telephone system in America, is a signal triumph for private enterprise conducted in a public-spirited manner. Unhampered by royalties and restrictions it has developed rapidly and naturally, or rather it has developed with the luxuriance of a garden whose soil has been scientifically enriched by a skilful gardener. For it will be seen from the report the constant pains taken and expense incurred by the Company to improve plant and methods; indeed, their studies of traffic and development have formed models for the whole telephone world. Europeans, dependent as regards capital which is the life-blood of the system on all kinds of political considerations which sway Governments and Treasuries, must regard with envy the ease with which money is obtained and the businesslike liberality with which it is expended in America. What wonder that capital is readily forthcoming when it goes to supply a public need, an immense convenience, which is gladly paid for by those using it, and which earns handsome returns? But no less wonderful must that state of things appear under which the capital is not forthcoming, in which the public demand is not satisfied, and the development of one of the greatest social and commercial aids of our time is artificially restricted, and at the same time a source of public revenue neglected. This surely is a phenomenon at which future economists will marvel and admirers of our age fail to explain.

## TELEPHONE LOADS.

THE exhaustive paper on the "Telephone Load Line," by Mr. H. DEANE, of which we publish the first instalment in another column, will be of especial interest at the present time when much has been heard in the Press on the grievances of operators in other telephone administrations. It is by such close and scientific study of the question as this that the apportioning of the load of each operator's position is arrived at and an equitable uniformity of work obtained from each. From some extracts from a report on the French Postal Budget which we publish it will be seen that although in Paris the average number of subscribers attended to per operator's position is less than in London their work is actually more harassing because there is no scientific distribution of the load and many are overworked whilst others in consequence have not enough to do.

In a task such as operating it is obvious that it is the quality rather than the quantity of the work which is harassing, and the proper distribution of the busy subscribers over the positions and the provision of suitable arrangements for referring all troublesome calls to monitors does much to smooth the operator's way and enable her to handle with ease a heavy load of straightforward calls where a much lighter load of irregular and harassing calls would be more than she could bear. In this matter, as in other matters of administration, order is everything. To be fully employed is no grievance, and with this end in view the load is determined; but to be worried is quite another thing. The monitorial system is



introduced to relieve the operator of all worry and of all troublesome calls; the supervisor combines with her supervisory duties the rendering of assistance in times of pressure. We do not seek to make light of the exacting and continuous duty performed by our operators day in and day out with, on the whole, great conscientiousness and dispatch, but we wish to remark on the careful study and attention which is given to the details of their work and the constant watchfulness which is exercised to fit the burden to the back.

### THEORY AND PRACTICE.

In an article which we published on the difference between "Theory and Practice in Contract Work," the writer seems to suggest that there is some natural opposition between the two terms, and there is no doubt that his view is shared by many. Theory and practice are, however, complementary to each other. Sound practice is based strictly on theory, and theory is evolved from sound practice.

The thoughtful worker pondering over the principles of his daily practice evolves new theories, which in their turn become the basis of the ordinary man's practice. Which was first in the world is as much a matter for speculation as the problem of the hen and the egg. Did primeval man originally encounter physical and moral problems at haphazard and found theories according as he was successful or unsuccessful, or did he first invent some crude kind of theory and act upon it, modifying and amending it as practice suggested? Did he attack the aurochs or the great elk with his rude weapon without some theory as to how the latter should be most effectively used, or will it be claimed that he depended entirely on practice? If so, was not that practice based on some primitive theory? Probably it was, for it is impossible to embark upon any new course of action without some rough theory as to how we are going to act. In any case, the line between immature half-considered theory and tentative, experimental practice is often a fine one. The first man to employ steam as a motive power must have formed a theory of its expansive properties before he attempted to use it. By practice he would be able to fix his theory more exactly, and this exact theory would form a law to guide future practice. Alike in arts, sciences, and industries practice must be preceded and guided by theory, if not by accepted theories at least by those of the artist or worker himself.

The explanation of the popular idea of antagonism between theory and practice lies in the fact that purely practical and purely theoretical men are equally incomplete and contemptuous of one another. The man skilled by long practice and experience in the workshops looks down on him who comes armed only with book-knowledge, while the man trained and taught by theory despises him who would be completely lost if called upon to do anything outside his everyday practice. The man who is steeped in theories which he has never seen applied, and the man versed in practices of which he is ignorant of the underlying principles will probably be found wanting when put to the test. It is clear that one must supplement the other, and if experience is the more pleasurable we cannot afford to dispense with the theory upon which laws are founded.

GOETHE'S Mephistopheles says:

Grey is all Theory, dear friend,  
And green the golden tree of Life.

But theory is more a thing apart from practice in life than in work.

In the former we are instructed by instinct and impulse; in the latter we must be guided by that acquired knowledge which is born of theory. After all, what Mr. LIVENOR says, in effect, is that, considering the standard theoretical principles of contract department working not applicable to a certain part of London, he has evolved theories of his own.

### HIC ET UBIQUE.

LIKE the dog's fabled first bite it seems that in France the irritated telephone subscriber is to be allowed his first swear. At any rate we read in the Press that hitherto the subscriber using strong language to operators could be cut off from all communication without warning. Henceforth the short-tempered will receive an admonition on a first offence. On a second display of feeling they will be cut off for two days, while a series of personal complaints of a subscriber's language will lead to rupture of the contract.

"HEART-BEATS a hundred miles away." So run the headlines in the daily papers, referring not to the telepathic sympathy of lovers separated by pitiless space but to the sound-magnifying telephone of Mr. Sydney Brown. Thus are the most cherished figments of the poets reduced to plain fact by the advances of science.

In the *Electrical Engineer* appears a quotation from a German paper entitled "Automatic Telephony." It reads:

We Germans seem to be in too great a hurry in this matter. Friends in Munich are loud in their complaints. They say that they are greatly hampered in talking to us here in Berlin. They could do it quicker if they could catch hold of the receiver in the good old way. It may seem strange to talk about the common or garden telephone as an old-fashioned instrument, but at the same time the automatic devices do not yet quite seem to be able to entirely replace the human hands.

Careful readers of the JOURNAL will gather from our remarks on page 130 of Vol. II and page 144 of Vol. IV that we quite agree.

WHAT the *Daily Express* describes as the greatest dog story on record is to the effect that a terrier which was accidentally shut up at night in the shop of Mr. J. M. Tierney, tobacconist, of Cleethorpes Road, Grimsby, knocked the receiver off the telephone and attracted the attention of the operator at the exchange to his predicament by barking loudly into the instrument.

The operator at once communicated with Mr. Tierney and the dog was released.

Our Hull correspondent whilst saying that the facts have been verified and are quite correct, adds that the feat is due, he thinks, not so much to the dog's intelligence as to the convenient position of the telephone for getting its receiver knocked off by the restive dog.

THE new submarine cable between Abbot's Cliff, Dover, and Cape Grisnez, was laid on May 5 by the cable ship *Faraday*. The *Faraday* began paying out the new cable at seven o'clock in the morning, and had laid it right across to Cape Grisnez, a distance of eighteen nautical miles, before noon. This new cable is to be used for telephoning only and has loading coils inserted. The equivalent of this cable if unloaded would be 2'377 and when loaded the equivalent becomes 7'286, so that the improvement due to loading is 3'06 times. The cable is at present buoyed both off Abbot's Cliff and Cape Grisnez, and all that is necessary is to splice it up with the land cable on either side of the Channel connecting London and Paris. This work will be done by the Government telegraph steamer *Monarch*. There are now eight Channel cables from Dover.

OUR Italian contemporary *Telegrafia e Telefonica* asks us to call the attention of our readers to the fact that an album, containing 50 original photographs of the offices destroyed by the earthquake in Sicily, groups of telephone officials and other interesting scenes, is being sold (price 5s.), for the benefit of those employees affected by the disaster, in which some 300 officials met with their death and many others lost everything they possessed. A series of 40 pictorial postcards with the same views as in the album is obtainable for 2 francs, or including 5 centime stamp and the office stamp of Messina, 4 francs (about 3s. 2d.). The Editor will be pleased to accept orders.

### THE TELEPHONE CRISIS IN FRANCE.

We have before us the Report on Posts and Telegraphs made by M. Charles Dumont for the Budget Commission charged with the examination of the French Budget for 1910. He devotes over 70 pages to telephone questions, and is very outspoken in his criticisms. The report, indeed, is couched more in the style of a newspaper than a blue book, Section IV (The Telephone Service) beginning as follows with a heading in large type:—

#### "IL Y A PEU DE TÉLÉPHONES EN FRANCE.

"The telephone administration has been unable to see or do its duty. The telephone does not render to the nation, to its commerce, to its industries, business, social relations, to those who travel for pleasure or business, the services which in other countries State administrations or private companies have obtained from this marvellous instrument of intensified life and accelerated communication—the telephone." Here follow tables and figures showing the poor development of France in comparison with other countries.

"Our system is poor. Almost everywhere the service is mediocre and even bad. . . . We confine ourselves to the Parisian telephone crisis. It has lasted more than ten years with alternating recrudescences of intensity. It sums up all problems in their most difficult aspect. . . . Is it necessary to describe the misfortunes of the telephone subscriber? The disheartening wait while the receiver rests mute at the ear—the fleeting distant voices, conveying confidences of which one can make nothing—another subscriber waiting one knows not where.

"At length the long-expected voice of the operator is heard. Our number repeated by her mingles with three or four others cried out by other operators.

"Won't the subscriber answer? Is he at home? Is his line in order? one waits to know.

"While one waits suddenly an unknown voice demands a number, and despite our denials insists that we are the operator at the Saxe Exchange, or Sablons or Desrenaudes.

"For how many hours during these ten years have Parisians endured this torture, supplicating, demanding, resigned, and smashing at times their telephones, having them repaired again, taking new hope, contented almost if an official letter explains to them there are technical causes for their tribulations, counting on the days when things will be better.

"Despite all, the subscribers increased from 19,351 in 1898 to 44,863 in October, 1909.

"The telephone, as a matter of fact, adapts itself so marvellously to the exigencies of the life of our times, encumbered with occupations, appointments, curiosity, pleasure—that, in spite of nervous crises and broken apparatus, a few more satisfactory communications and a few journeys saved suffice to renew the patience and hope of subscribers."

The report goes on to say that during the last three years the transfer of the multiples in the central exchanges of Paris and the fire at Gutenberg Exchange have aggravated the crisis. At La Roquette, an exchange of 4,200 subscribers, the lines out of order reached 764 in four days. At La Villette, 4,500 subscribers, the faults mounted up to 2,371 in the first fifteen days of October. "These figures are frightful," says the report. "They proclaim a veritable disorganisation of the service. . . . To have dared to inflict the crisis of the transfer without having foreseen and taken the necessary measures that it should be rapid and scarcely perceptible, remains an unpardonable fault on the part of the telephone administration."

The administrative and constructive departments have been unified by M. Millerand and a single responsible administration formed for the construction, maintenance and working of the telephone system. Among the proposed reforms some are immediately realisable, while others presuppose an extension of the system and a notable increase in the number of subscribers. "To awaken initiative and determine responsibility," says the report, "to utilise rationally the material and staff at hand, this is the crying need of the moment. To construct new exchanges, to fix new tariffs, to substitute perhaps another system of switching for the manual multiple on the central battery, these at present are thoughts for to-morrow. To wait until you can do better what you can now do

well is a proof of idle inertia. Not to foresee in the present working the exigencies of the future leads to costly blunders and demonstrates an unpardonable lack of foresight."

It is almost a surprise, says M. Dumont, to find in the established staff of the telephone service so many men of high technical value and so hard working. Why have their efforts produced such mediocre results? Because they are misplaced, their functions are ill-defined, and their decisions do not result in rapid movement nor affect the whole of the machine. It is well that there are no longer two directors nor two parallel hierarchies of bureaucrats opposing each other. Good results should follow this initial change. A technical department will study complete programmes for working an ever-better system ever-better equipped.

In criticising the faults on lines and instruments the report points out that France is the only country in the world where subscribers are free to choose their own types of instruments. They exceed one hundred varieties, and although the administration does not provide them it has to maintain them. Can it be wondered at that the percentage of faults is high? For this reason the central battery system was not adopted in its integrity. Economy, says M. Dumont, is a bad reason for this. After the experience gained the necessity of regular working is of prime importance, and a supplementary expense of some few francs would be quickly recouped by decreased cost of upkeep.

The report criticises in turn the administrative staff, the switching system, the operating staff, enquires into the nature and extent of faults, discusses the extension of the system and goes into the question of large exchanges and long lines, or small exchanges and short lines, and the question of party lines and the reform of tariffs generally. Dealing with the question of operating, it says that the signalling system wants improving, the hours of service require consideration, and the arrangements for the recruiting and training of operators overhauling. In Paris there are far fewer subscribers per operator than in London or Berlin, yet owing to inequitable distribution of lines the best operators are allotted all the heavily loaded lines and are quickly overcome and discouraged, and the idea of being overworked when a colleague not far distant is idle is not conducive to good results.

The report is exhaustive and interesting, and insists throughout on the necessity of immediate reforms. The state of French telephony is due in some degree to the half measures which have been taken to bring the service up to date, but the list of annual capital expenditure on page 132, from which it appears that only £400,000 to £450,000 a year has been expended on the service in recent years, accounts for much.

### TELEPHONY IN JAPAN.

BY W. NAPIER.

In the December, 1909, issue of the JOURNAL there appeared two photographs of the new Shiba Exchange in Tokyo. As the opportunity does not often arise of obtaining first-hand information regarding telephone exchanges in Japan it appears to me that some further photographs and particulars will be of interest to the readers of the JOURNAL.

Fig. 1 shows four of the six exchanges which serve Tokyo; the Honkyoku building contains the trunk exchange as well as the local exchange. Figs. 2 and 3 show the switchrooms in Honkyoku and Naniwa Exchanges. The operators in the Japanese exchanges wear uniforms which they provide themselves, operators wearing maroon-coloured skirts and supervisors purple skirts. In the summer white blouses are worn and in the winter black blouses, by both operators and supervisors; the sleeves of the blouses have, near the cuffs, a band of ribbon, the operators wearing pink, the supervisors green and the senior supervisors white ribbon.

Fig. 4 shows the operators' garden at Shiba Exchange; this is the only exchange at which a garden has been provided. Fig. 5 shows the operators' sitting-room at Honkyoku Exchange; the



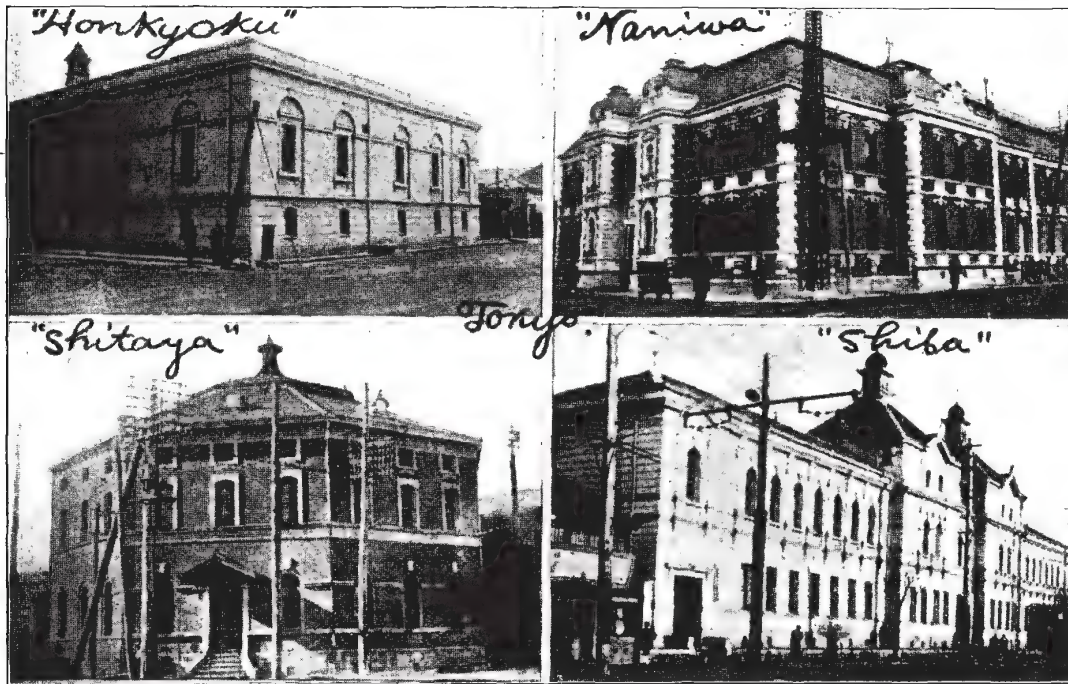


FIG. 1.

operators kneel on the floor, which is completely covered with a kind of cushion made of fine woven straw, each cushion being about 6 feet by 3 feet in size. The round object in the foreground of the picture is a firebox, in which Japanese charcoal is burnt.

In Osaka, the second largest town in Japan, there are about 10,000 exchange lines served by three exchanges — Higashi (East), Nishi (West) and Minami (South). Each of these exchanges was specially built for telephone exchange purposes. The Higashi building contains the local exchange with about 4,300 lines and also the trunk exchange, which is shown in Fig. 6. Minami Exchange has a Western Electric Company's central battery equipment of standard type, the other two exchanges having magneto equipments with self-restoring indicators.



FIG. 2.



FIG. 3.



FIG. 4.—OPERATORS' GARDEN.



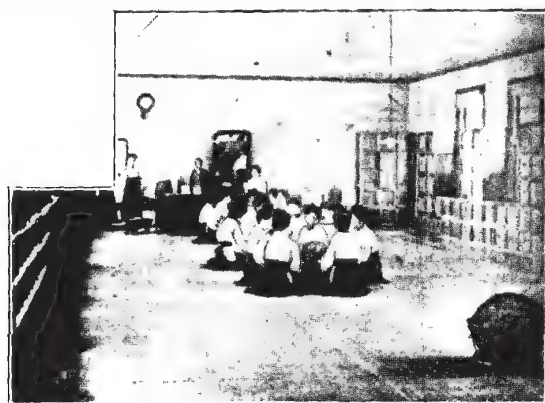


FIG. 5.—OPERATORS' SITTING ROOM.

The following are some traffic data for these four exchanges, extracted from a peg count taken on July 10, 1909, and show that the subscribers make a large use of their telephones:—

Exchange.	Honkyoku (main exchange).	Naniwa.	Shitaya.	Shiba.
System.	Self- restoring indicators.	Self- restoring indicators.	Magneto: lamp signals.	Central battery.
Number of subscribers' ex- change lines ... ..	3,336	4,514	3,199	1,256
Number of exchange stations	4,072	5,222	3,495	1,355
Number of originated calls per day ... ..	56,031	81,591	43,357	17,420
Percentage of outgoing junc- tion calls ... ..	76	49	77	84
Number of incoming junc- tion calls per day ...	48,782	45,601	27,021	11,192
Number of "A" positions...	45	55	35	14
Number of "B" positions...	22	22	17	9

Trunk talking is carried on between Tokyo and Nagasaki, a distance of about 1,000 miles.

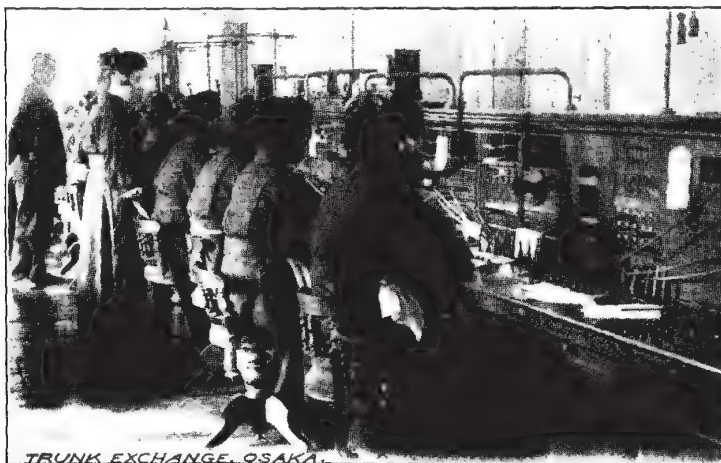


FIG. 6.

I am indebted to Mr. Risuke Wakameda (Electrical Engineer in the Department of Communications, Tokyo), who is at present in this country studying the telephone business, for the above pictures and information.

### LONG SERVICE MEN.

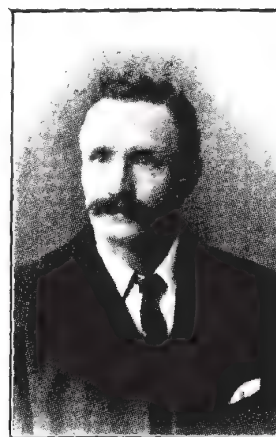
MR. W. CLEARY, Assistant Engineer, Manchester, completed 30 years' service on Feb. 28 last. He joined the service at Bolton on Feb. 28, 1880, and took charge of the Manchester Ship Canal installation during its construction in October, 1890. He was transferred to Manchester to assist in the metallic circuiting, and in the transfer from the Royal Exchange to Central under Mr. Watts in 1893. Mr. Cleary is of a very genial nature and is deservedly popular with the staff at Manchester.

FOREMAN CHARLES BUSH, whose photograph is here reproduced, has been engaged in outside telephone work since July, 1880, so that next month he will have completed 30 years of service. He was first of all a wireman, employed by the Edison Telephone Company, in London; in 1883 he was appointed foreman, and has been continuously employed in that capacity since. This is surely a record amongst the outside staff.

In the first ten years of his service Foreman Bush worked in various districts of London, but for the last twenty years he has been engaged in the City. He can recall being one of those employed in running the first telephone wires that were erected in London; these lines ran from Billiter Square to Tooley Street, the Thames being crossed in a single span. It is rather difficult to imagine, with our present telephone development on the south side of London, what the result would be of any attempt to supply service by open wires across the river.



W. CLEARY.



CHARLES BUSH.

Foreman Bush is an enthusiastic supporter of the City Football Club, and has served on the local committee of the Staff Transfer Association. He contrasts favourably the more scientific methods of engineering work to-day with those which prevailed in his early days.

MR. J. T. COOK, Engineering Inspector, Nottingham, completed 25 years' service with the Company on May 2. Mr. Cook was the first member of the construction staff employed in Nottingham and ran the lines for the two subscribers with which the old Nottingham Exchange in Bottle Lane was opened in November, 1881. Mr. Cook left the service in 1883 and joined again in May, 1885, since which date his service has been continuous. He had experience of a large amount of junction work in the early days, running the first twisted junction from Nottingham to Loughborough with the No. 11 galvanised iron wire, and also dealt with the sections Nottingham-Manchester, Nottingham-Sheffield, Nottingham-Mansfield, Derby-Leicester, Nottingham-Leicester, and Northampton and Wellingboro'. The first district manager he served under was Mr. Joseph Chambers, who had headquarters at Leeds, and since the opening of the Nottingham district he has served under five district managers and five local managers.

MR. W. H. CROOK, Chief Clerk, Swansea, has just completed 25 years' service, having joined the Western Counties Telephone Company at Bristol in April, 1885. He was transferred on July 1, 1900, to Gloucester, and on April 4, 1906, to Swansea.

### THE STAFF DINNER AND ANNUAL MEETING OF OFFICERS.

As our readers are aware these annual functions were postponed from May 27 on account of the lamented death of His late Majesty King Edward VII. The new dates which have been fixed are June 23 for the Dinner and June 24 for the Officers' Meeting.

**Visitors.**—Mr. Theodore Newton Vail, president of the American Telephone and Telegraph Company, was a recent visitor at Telephone House.

### AN ECHO OF THE FARADAY MEMORIAL AT BARNSBURY.

THE following extracts from the recently published *Life of Lord Kelvin*, by Professor Sylvanus Thompson, will be of interest to our readers:—

An interesting ceremony, which linked together the names of Faraday and Kelvin, took place at Barnsbury on November 24, 1906, when Lord Kelvin unveiled a memorial tablet to Faraday in the room where Faraday, as an elder of the Sandemanian Church, used at times to preach, and which had now been transformed into a switchroom of the National Telephone Company. Lord Kelvin's words on this occasion were spoken with great emotion. . . .

Lady Kelvin wrote to Miss King, saying "Your uncle was the only person present who had ever seen Faraday, except some of Faraday's own family; and he made his little speech on his personal recollections. It was all quite a success."

### MONITORIAL WORK.\*

By MARIA CUTTING, *Monitor, Hull.*

IN the ordinary walks of life one meets from time to time with handy labour-saving methods, and wonders how life was possible without them. We may equally wonder how the work of the telephone switchroom was conducted without the aid of the monitor.

Every monitor who knows her work should be an absolutely reliable directory, with all the necessary qualifications of a detective for discovering information and supplying it to irate subscribers. Other qualifications are a temper which is never ruffled, limitless tact and a Job-like patience. It is also taken for granted that she is skilled in the handling of calls, and understands all the workings of her table, so that she can get full value out of it. She must also have a thorough knowledge of the current rules and regulations in existence in her department.

Readers uninitiated into the mysteries of the switchroom would be inclined to consider the ordinary day's work of a monitor, when written down, to be a fiction conjured up by a vivid imagination. The monitor by going into complaints and bottoming them brings to light faults, which are duly reported. Each complaint is made out on a docket, and when the trouble is located the cause of it is written underneath the subscriber's complaint.

After explaining the cause of the trouble and completing the connection when necessary, the flashing signal is given to the operator, who is instructed whether the call has to be debited or credited.

Subscribers often complain of careless operators connecting them to wrong numbers, when a search reveals the fact that the number asked for has long since been changed; that they are using a billhead, a card, an old directory, a list of their own making, or any other possible one but the correct current directory.

If the person asked for is not a subscriber, his name and address with the calling-subscriber's number is noted, and afterwards handed to the contract manager, so that he can communicate with the non-subscriber, and use every inducement to persuade him to have a telephone.

\* Abridged from prize paper read before the Hull Telephone Society.

Said a lady subscriber the other day: "Can you give me Ellers at the corner of Dock Street?" "What are they?" asked the monitor.—"Timber merchants," was the reply. "Are not Horsley Smith's at the corner of Dock Street?" queried the monitor. "Oh yes, that's it," answered the subscriber. "No. 70" says the monitor. The flash-back signal is given and the monitor is soon busy in another direction.

"I want Arthur Booth, coal merchant," demands another. "Did they not go out of business some little time ago?" asks the ever-ready monitor, and then tactfully supplies the information (as if refreshing the subscriber's memory), "the manager commenced business for himself, you know." "Well, I want Capt. —; he used to work there," says the subscriber. "Shall I connect you to the late manager? Perhaps he can supply the information?" He can, and the monitor learns that Arthur Booth has commenced business again under another name. All this time and trouble could have been saved had this been noted on the advice form when he again became a subscriber.

"Will you give me the number of the nearest doctor?" splutters some excited individual; "there's been an accident." "Where are you?" quickly demands the monitor. "— Street." "Right, Dr. Blank; I'll connect you."

"I can remember the address; it is 32, Thoresby Street, but I cannot remember the name, nor the telephone number," complains a measured rate subscriber. "Is it Nurse Lonsdale you require?" asks the monitor. "Yes, that's it," delightedly comes back the reply. Another caller satisfied!

"Your operator says there is no reply from —, and I know someone must be there," comes an angry voice. "Oh yes, I will give them another ring," says the monitor, and once more patience is rewarded. On being asked if their bell had not been ringing, this reply was received: "I have been in the mill, and one cannot hear the bell there for the noise." "You can have an extension bell put in for 5s.," says the monitor, and thus two birds were killed with one stone—the cause of the delay was explained to the subscriber and the contract manager gained an order.

Another lady asks for "Corporation Enquiry," and explains she desires to speak with them because she wants a telephone. "Why not have a National?" asks the monitor. "It is just as cheap, and there are more than twice as many subscribers to the National system as there are to that of the Corporation." "I do not mind who supplies it, so long as I get one," comes the reply. To finish the story, I may add that the contract manager got the order.

Extensions are not always shown in the directory as they should be, and thus led to the monitor ringing up a certain confectioner to enquire if he had an extension to his branch. "No, I have not," he answered. "Well, you are losing orders," he was informed, "shall I instruct our contract manager to call upon you?" "Yes, you might as well," said Mr. Confectioner, and again the National Telephone Company did business.

The operators were continually reporting a certain number. The reason of this was brought to light in a curious manner. One of the operators, a friend of the subscriber concerned, heard on a visit one day the howler proclaiming the fact that the receiver was off the hook. She drew her hostess's attention to the fact, and was instantly informed that the buzzing noise kept baby quiet.

Time and space will not allow of further instances of this branch of the monitor's daily routine; suffice to say that a whole book could be devoted to nothing else.

To put the whole case in a nutshell, the monitor is the speedometer of the service; she takes service tests; she listens in on operator's positions whenever time will allow, and helps the operator by removing difficulties.

It would seem that there is no end to instruments and general faults, and one is led to believe that so long as human agency is required in the switchroom so long will there be faults to be found.

One qualification mentioned in the opening paragraph of this paper was an almost limitless tact, and nothing ever spoken or written is more true. This is especially the case in towns where a





for this, as the proportion of new lines to cessations varies very considerably in different areas.

The third item, however, is perhaps the most important, as it provides one with the data on which to base a development study for any particular part of an area. This has proved most useful in scattered areas, of which there are many, and in the following circumstances:—

(a) *Wayleave Difficulties.*—A span has to be removed, necessitating splitting up the area. What has been the development for each of the two separate parts of the area? This information if obtainable, will enable me with more accuracy to forecast the future growth. Here, again, *average* figures for the whole area do not suffice as many areas include both fruitful and unfruitful localities as regards telephonic development.

(b) *Underground Extensions.*—The same applies here as in case (a). What is the best division of the present area? The card system I have outlined will give great assistance in dealing with this question.

(c) *To see that the Plant Erected is Properly Utilised.*—The contract manager has estimated for a certain number of subscribers (say, 23) in a certain part of an area. On that understanding a 25-pair cable has been erected on the route supplying that part of the area. How is that developing? Are the subscribers being joined up as anticipated? If not, the contract manager must be advised, so that a more thorough canvass may be made of that locality. If the rate of development is above that anticipated, the contract manager must relax his efforts in that locality. In this way the engineer keeps a watchful eye on the utilisation of the spare capacity which has been erected. How does Mr. Taylor obtain this information from his card system?

Mr. Baldwin states that this information is "obviously indispensable," but I do not see how it can be obtained from his, or from any card system which does not give names and addresses of the subscribers joined up and ceased. Consequently, I do not understand the next sentence of his letter which states that "the information—with the single exception of that provided for in the last column seems quite valueless, etc."

The reason of the first and second columns is to facilitate investigations when a cable has been filled up and the contract manager is inclined to query whether the spares have been used legitimately, or whether lines have not been cut in from some other area, and thus utilised the spare capacity which should exist in accordance with his survey. And what will be more interesting and useful, if at the end of the period planned for, the card is compared with the survey plan giving the addresses where it was estimated the subscribers would be obtained?

As regards the economical side of the question, I do not agree that the system "is decidedly wanting"; for, as I previously stated, it requires but very little time to keep up if done daily. As to six entries being made for each line, this is but a small matter, as the information is simply taken direct from the "handing-in book" (which is the book in which particulars of all lines are entered when completed by the Engineering Department, and handed over to the Instrument Department for the fitting of the instruments).

The back of the card could be squared for graphical representation as suggested by Mr. Baldwin; but it is doubtful as to whether the time spent in this way would be time well spent.

Bristol, May 18.

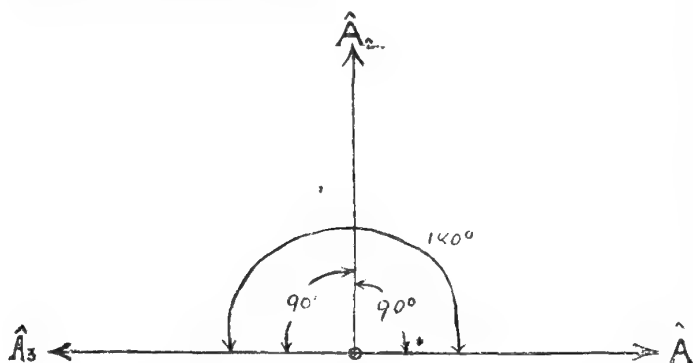
E. L. PRESTON, Engineer.

✓ OR ✓ - 1.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

At the present time a considerable number of the staff are studying transmission, and judging by the requests for information there seems to be some considerable difficulty in understanding the meaning or significance of

✓ or ✓ - 1, and I venture to send you the following remarks in the hope that they may be of assistance to a few more members of the staff than I have been able to communicate them to.



Let  $\hat{A}_1$ ,  $\hat{A}_2$  and  $\hat{A}_3$  above be three vectors of equal magnitude and in the same plane, and the magnitude of the vectors in the horizontal direction be considered + when measured from left to right and - when measured from right to left.

Then as  $\hat{A}_3$  is equal in magnitude and direction to  $\hat{A}_1$ , but opposite in sense, it must be equal to  $-\hat{A}_1$ , which can be proved by setting the beginning

of  $\hat{A}_3$  at the end of  $\hat{A}_1$ , and thus obtaining their sum, which will obviously be zero.  $\therefore \hat{A}_1 + \hat{A}_3 = 0$ .  $\therefore \hat{A}_3 = -\hat{A}_1$  or  $(-1) \times (\hat{A}_1)$ .

Now examine the diagram with a view to converting  $\hat{A}_1$  into  $\hat{A}_2$ , as shown above. This can be achieved arithmetically by multiplying by  $(-1)$ , and from the diagram it will be seen that to do it geometrically we must rotate the vector  $\hat{A}_1$  through  $180^\circ$  on two right angles.

Suppose that this rotation be done in two equal stages, then at the end of the first stage the vector will occupy a position at right angles to the original vector  $\hat{A}_1$ . This new position is shown above as  $\hat{A}_2$ . If now the operation which has converted  $\hat{A}_1$  into  $\hat{A}_2$  be performed on  $\hat{A}_2$  we shall obtain as a result the vector  $\hat{A}_3$ , which is equal in magnitude and direction to  $\hat{A}_1$ , but is opposite in sense, that is, equal  $(-1) \times (\hat{A}_1) = -\hat{A}_1$ .

Therefore the operation which we have performed geometrically by rotating  $\hat{A}_1$  through  $90^\circ$  must be the same as we should perform arithmetically by multiplying  $\hat{A}_1$  by  $\sqrt{-1}$  as if we repeat this operation we should get as a result  $\hat{A}_1 \times \sqrt{-1} \times \sqrt{-1} \times \sqrt{-1} \times \sqrt{-1}$  which is the same as  $\hat{A}_1 + (\sqrt{-1})^2 \times (-1) \times (\hat{A}_1) = \hat{A}_1$ , which is the same as before.

From this it follows that the arithmetical multiplication of a vector by  $\sqrt{-1}$  is equivalent to the geometric rotation of a vector through one right angle.

East Exchange, May 17.

H. S. PECK.

#### STOCK DIFFERENCES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

AGAIN we are in the throes of stocktaking and have to face the usual differences, and, naturally, the many explanations, such as "Rats eating the Russian tallow," "Sun drying up the compo," etc., etc.

It is possible, however, to advance a real reason which at first sight might be placed in the same category.

For instance, the following case cropped up in this district, the veracity of which is vouched for by the local manager and officers concerned.

Whilst posting stores slips I came across one, which aroused my curiosity, owing to the fact that it bore mysterious yellow spots, and upon investigating I found that a figure which once existed had been completely obliterated by one of these yellow spots.

It appears that during some secondary battery tests a few drops of the sulphuric acid fell on the table and later the slip in question was accidentally laid face downwards on the same spot. The result was the complete discharge of the copying ink pencil figure.

Probably it will prevent this action being adopted as a method of adjusting stock when I remind the reader that a definite yellow stain remains where the acid touched the paper.

11, Bench Street, Dover, May 13.

J. U. WOOD, Stores Clerk.

#### SUBSCRIBERS' APPARATUS CARDS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

EVERYONE concerned with subscribers' instrument records must concur with your Nottingham correspondent's views, expressed in your April issue, as to the necessity for such records being reliable.

Mr. Cockrem must have sorely regretted that no scheme existed at the time of the inauguration of C.B. equipment that would have assured his records being put in order automatically and thus have obviated the necessity of a check and of inflicting this duty on the inspectors.

Apparently the Nottingham records were not up to date, and unless it has been realised that "Prevention is better than cure," the work of checking will never cease.

In London the trouble was anticipated and suitable steps were taken to avoid chaos. Forms were prepared and compiled by the Fitting Department at the time instruments were changed. These furnished all necessary details of recovery and new equipment, and were passed on to the fault clerk in order that he might bring his records up to date.

Apparatus cards should always be entered up from Fitting Department's advices, and checks of apparatus would not then be necessary. It is always a questionable procedure to impose clerical duties on the instrument inspector, who is handicapped in the performance of his primary duty if he is called upon to devote his attention to the checking of apparatus and compiling of lengthy records.

In London, where economy ranks in the same line with efficiency, record keeping, as far as subscribers' apparatus is concerned, is not allowed to run riot, and we are inclined to wonder at the utility of the form submitted by your correspondent.

There can be but little object in summarising single instruments under such varied headings, and when a variety of classes of apparatus are dealt with such a record would be enormous.

We satisfy ourselves by keeping a summary of totals week by week in book form, headed as above.

Date.	Terminating on insts.		Extension insts.	Party line insts.	Cab shelter and car call lines.	Intercom. insts. on rental.	Fire posts (renewed) with trans.	Answg. insts. & emergency insts.	Sales insts. maintained on rental.	Switchboards counted as one inst	Hire purchase insts.	Fire alarm posts.	Fireman's bells.	Electrophone sets	Tel. installations maintained.	Terminating on subcls		External extensions on switchboards.	Metaphones maintained free for 3 months.	Items 6 to 10 Return.	Official stations as per No. 3 Return.	Official and unofficial stations.	Stations to be periodically inspected
	Ex. lines.	P. lines.														Ex. lines.	P. lines.						
R. F.	6277	1385	9746	..	..	109	..	7020	376	1624	..	..	..	1	144	6853	2026	214	9	25314	17717	29191	27082
W. E. 7 4 10	17	10	19	..	..	..	..	18	2	4	..	..	..	..	..	10	5	1	..	66	46	68	70

E. RUSSELL.

THE sudden illness and death of His late Majesty, King Edward VII., had a considerable effect on the London traffic. The general anxiety prevailing on the afternoon of Friday, May 6, caused an abnormally heavy load at all exchanges. The serious turn taken by His Majesty's illness also made special provision necessary for the night service. Exchanges most affected were Holborn—which serves most of the newspapers (Gerrard, Faddington, Westminster and Kensington), the four last named all dealing with West End traffic. Several of the day operators remained on duty until 11.30 p.m., and in anticipation of a rush on Saturday morning, extra operators were drafted in at 4 a.m. and 7 a.m. Saturday's traffic was enormous, the large drapery houses in the City and West End being particularly busy, presumably with mourning orders. At Westminster Exchange, where the calls from the Buckingham Palace private branch exchange are dealt with, extra operators were kept on duty until after the Sunday, and arrangements were also made for the Company's operators at the Palace to remain on duty continuously. Orders for two additional exchange lines to the Palace were received at noon on Saturday, and although the gangs had actually left the Company's premises for the day, men were got quickly together, and both lines were working by 6.30 p.m. on Saturday evening.

CHELTENHAM has three small local societies, namely, "The Benevolent Fund" (worked in conjunction with the Gloucester district), "The Telephone Society," and "The Owing Fund." The latter is dealt with as follows:—Every week each member contributes a sum of money from his or her wages towards their annual holiday. Sums from £1 to as much as £5 have been drawn out from this fund, which has been working most satisfactorily for the last two or three years. These funds entail a large amount of work on the part of the local hon. secretary, Mr. W. A. Taylor, and on Christmas Eve Mr. A. D. Pike, Local Manager, on behalf of the local staff, in the unavoidable absence of Mr. C. Elliott, presented Mr. W. A. Taylor with a fountain pen as a mark of esteem and gratitude for his unremitting work for the last two years.

## NEWS OF THE STAFF.

Mr. C. W. BEAUCHAMP, Contract Officer, Chester, has been promoted to the position of Contract Manager for the Hanley district.

Mr. J. H. SWAIN, Exchange Manager, Central Exchange, Liverpool, has been appointed Traffic Manager for the Leeds district. Mr. Swain joined the Company's service in Liverpool as a clerk in August, 1892, and was appointed in August, 1900, Exchange Manager at the Central, which had then over 5,000 direct lines. Prior to leaving Liverpool to take up his new duties he was presented by the District Manager, on behalf of the staff, with an oak clock from the Central operators, past and present, and with a roll top desk from the rest of the staff.

Mr. R. S. GROSVENOR, Local Manager, Walsall, was presented on April 1 with an oak hallstand by the Walsall and Wolverhampton staffs on his leaving Walsall to take up the position of Local Manager at Coventry. The presentation was made by the District Manager, Mr. Archer W. Smith.

Mr. F. E. WATERS, of the Solicitor's Department, Head Office, has been made a Fellow of the Surveyors' Institution, on which we heartily congratulate him.

Miss MARY HADLEY, Travelling Supervisor, Traffic Department, Birmingham, has been promoted to be Clerk-in-Charge of the new Edgbaston common battery exchange opened on April 30. Miss Hadley joined the service in 1898 and was promoted to be Supervisor at the Central Exchange on June 21, 1907. For some little time she gained experience by acting as Clerk in the newly formed Traffic Department early in 1907. She was promoted to be Travelling Supervisor on March 21, 1909, and in that position was responsible for the training of several travelling supervisors for the province. Her friends wish her every success in her new position.

Mr. ARTHUR MAY, Switchroom Manager, Leeds, has been promoted to Bradford as Traffic Manager.

Mr. WM. HIGSON, Exchange Manager in training, Dublin, has been appointed Switchroom Manager, Bradford.

Mr. W. BLACKBURN, Switchroom Manager, Bradford, on his transfer to Hull as Traffic Manager was the recipient of a silver teapot from his staff.

Mr. A. SPEIGHT, Chief Inspector, Keighley, has been promoted to the position of Electrician at Hull. His colleagues presented him with a slide rule on his departure.

Mr. R. J. SKELTON, Inspector, Harrogate, was presented with a safety razor outfit on his promotion to be Chief Inspector, Keighley.

Mr. H. J. MASKREY, Instrument Inspector, Halifax, has been promoted to Newcastle-on-Tyne as Switchroom Manager. As a parting gift the Halifax staff presented him with a shaving outfit.

Mr. R. KENWAY, on his transfer from Salisbury House to Telephone House as Storekeeper, was recently entertained at a smoking concert and presented with a marble clock by his friends in the London area.

Miss CHRISTINA E. MURRAY, Operator at Edinburgh Central Exchange, was the recipient of a gold bangle on leaving the service.

Miss JESSIE GALLETT, Operator at Edinburgh Central Exchange, who recently left the service, was the recipient of a gold bangle from a few of the staff there.

Mr. F. DICKSON, Instrument Fitter, Belfast, was presented with a Gladstone bag and razor on April 27 on the occasion of his leaving the Company's service to take up a position in Canada. Mr. J. D. W. Stewart, the District Manager, made the presentation.

Mr. R. CHRISTIE, Exchange Inspector, was presented with a kit-bag, travelling rug and gold scarf pin on the occasion of his leaving the Company's service to go to Canada. The presentation was made by the Chief Inspector (Mr. Pulford).

Mr. G. F. CONNEFF, Cash Book Clerk, was presented by the members of the Dublin staff with a dressing case on the occasion of his departure to Canada. Mr. T. J. Early, Chief Clerk, in the absence of the District Manager, made the presentation.

Mr. J. O. EARDLEY, on his transfer from Bristol to Head Office, received a presentation from his colleagues as a token of their esteem, and an informal gathering gave him a hearty send-off.

Miss SUSIE EMERY, Operator, East Exchange, Birmingham, left the Company's service on April 21, after four years' service. Her colleagues presented her with *Tennyson's Poems* as mark of esteem.

## Metropolitan Staff Changes.

Mr. P. E. RAPPS, Clerk, Cashiers' Department, Salisbury House, to be Clerk, Divisional Engineer's Office, Dalston.

Mr. H. WHITE, Engineer's Clerk, Bromley, to be Clerk, Sales Department, City.

Mr. C. R. RUTHERGLEN, Assistant Engineer, Greenock, to be Assistant Engineer, Lee Green.

Mr. E. GALLOWAY, Attendant, Salisbury House, to be Call Office Collector.

Mr. P. WALFORD, Apprentice, to be Assistant Engineer, City.

Mr. N. COLLINGWOOD, Night Watchman Inspector, to be Test Clerk, London Wall.

Mr. S. FOSTER, Improver at Metropolitan Workshops, to be Test Clerk, London Wall.

Mr. G. E. WOOD, Construction Foreman, Gerrard, appointed Chief Construction Foreman.

Mr. E. MERRIMAN, Fitter, London Wall, appointed Construction Foreman.

Mr. T. A. MASON, Inspector, Dalston, to be Test Clerk, Avenue.

*Traffic Department—Promotions and Transfers:*  
Miss AGNES ANDREWS, Operator, Holborn, promoted to be Supervisor, Avenue.

Miss ANNIE FAZAKERLEY, Operator, North, promoted to be Supervisor, Kensington.

Miss RUTH BRIGGS, Operator, Dalston, promoted to be Supervisor, London Wall.

Miss CONSTANCE GREGORY, Senior Supervisor-in-Charge, Streatham, promoted to be Clerk-in-Charge.

Miss GERTRUDE RYDER, Supervisor-in-Charge, Palmers' Green, promoted to be Senior Supervisor-in-Charge.

Miss EVA MELDRUM, Avenue, was presented with a handsome handbag by a few friends on her promotion to be Supervisor at Bank.

Miss THERESA CASEY, Supervisor, Avenue, was presented with an ebony-backed brush, hand mirror, hat brush and comb in case on the occasion of her transfer to London Wall.

Miss CAROLINE WEST, Senior Supervisor-in-Charge, on leaving Walthamstow to take up a similar position at Ilford, the staff at the former exchange presented her with a silver shoe horn, button hook and glove button hook in case.

On the transfer of Miss FLORENCE DINGLE, Supervisor, Kensington, to a similar position at London Wall she was presented by her late colleagues with a gold bracelet.

On Miss AGNES HASELTON's promotion from the same exchange to a position as Supervisor at Gerrard she was presented with a portmanteau by the Kensington staff.

Miss JESSIE DREW, Supervisor, Avenue, was presented with a gold brooch set with amethysts and pearls on her leaving the Company's service to take up another appointment.

## MARRIAGES.

Miss ALICE THURSTON, Chief Operator at Longton, has resigned from the Company's service, and was recently married to Mr. ROYDEN EDWARD DEAKIN, Test Clerk, Hanley.

Miss WILHELMINA NICOL, Operator at Leith, has resigned to be married.

Mr. W. H. FRIEND, Inspector, Ventnor, was presented on April 13 by the Isle of Wight staff with a striking timepiece on the occasion of his marriage with Miss MABEL ABBOTT, of London.

Mr. H. WELLS, of the General Superintendent's Office (Stores Department), was presented on the occasion of his marriage, which took place on April 30, with a marble clock and a pair of ornaments, subscribed for by the members of the Stores, Stationery and Engineer-in-Chief's Departments. The presentation was made by Mr. Chester.

Mr. C. D. KEMP, of the Head Office Audit Department, was presented with a marble clock and a pipe by the Secretarial Department on the occasion of his marriage on April 28.

Miss MARY A. TICEHURST, Senior Operator at Walsall, has left to be married.

Miss MUNDAY, Senior Supervisor-in-Charge, on leaving Ilford to be married, was presented by the operators in the East district with an oak palm stand and a trinket set.

Miss LILIAN SMITH, Operator, Avenue Exchange, London, was presented with a cruet by the staff on the occasion of her leaving to be married. Miss Smith was also the recipient of various other gifts, among which were dessert dishes, cheese dish, bread plate and table centre.

## OBITUARY.

We regret to announce the death of Mr. GEORGE INGOE, Local Manager at the Bury centre, which occurred suddenly on May 18. He had only been off duty during the same day, and it is typical of his character that he sent word to the office that he would resume duty the following day. Mr. Ingoe had completed 30 years in the service, and was in his 56th year. He started with the gang and worked his way up to his present position. The sympathy of his many friends in the North-Western Province will be tendered to his widow and family.

We regret also to report the death of Mr. JOHN PORTER, the Company's Storekeeper, Aberdeen, which took place on May 14, after a long and painful illness. The staff sincerely mourn his loss as he was held in the highest esteem by all who met him. As a mark of respect the staff subscribed for two wreaths and representatives of the various departments were present at the funeral.

## LOCAL TELEPHONE SOCIETIES.

**Bradford.**—The annual general meeting was held on May 13. The secretary's report showed an increase in the attendance of 3 per cent. over last session and a balance in hand of £2 1s. 4d. The election of officers for next session resulted as follows:—Hon. president, Mr. J. C. Chambers; president, Mr. H. B. Sutcliffe; vice-presidents, Messrs. C. Wood and J. Aked; committee, Messrs. G. Wicker, J. W. Stelling, T. W. Jowett, C. Brocklesby, and J. C. Walker; hon. secretary and treasurer, Mr. H. Shaw.

**Cork.**—The closing meeting was held on May 10. Mr. Kidd, District Manager, presided, and in the presence of a large attendance of members Mr. Lynn, Chief Clerk, read an excellent and interesting paper on "District Office Bookkeeping." The speaker treated the subject in a very practical manner as to the methods adopted in connection with office work. The paper was illustrated by diagrams. Lineman Inspector P. Carey gave a practical demonstration of clearing of faults, the subject being very ably dealt with, after which a very interesting discussion brought the meeting to a close.

**Cornwall.**—On March 2 a paper was read by Mr. T. Carter, entitled "Overhead Construction"; 100 per cent. of the members being present.

On March 23 two papers were read, one by Mr. D. J. Meikleton, Plymouth, entitled "Telephone Development and How to Sustain It," and one by Messrs. A. G. Wotton and C. Thomas, entitled "Instrument Fitting and Maintenance"; 90 per cent. of the members being present. The president, Mr. G. Hooper, occupied the chair at each meeting.



**Dover.**—The concluding meeting for the 1909-10 session was held in the district offices on April 22 (Mr. F. H. Duerth, Local Manager, Dover, presiding) when the District Manager, Mr. C. F. Ashby, addressed a good muster of members on the subject of "The Telephone Society and its Advantages to the Staff." Briefly reviewing the various papers given during the session, Mr. Ashby emphasised the good that could be derived by members of the staff attending the meetings, even if they were not directly connected with that particular branch of telephone work immediately under discussion. The lecturer's remarks were both interesting and instructive, and at the conclusion he was accorded a hearty vote of thanks. After the reading of the paper, the District Manager gave a few amusing and interesting experiments with a large plate glass electrical machine, briefly describing its action.

**Hastings and Eastbourne.**—A meeting of this society was held at Hastings on April 27, when Mr. H. Read (Chief Inspector, Hastings) read a paper on "Fault Finding," which proved very interesting. Mr. F. Armstrong (Local Manager) was in the chair.

**Leeds.**—The general meeting was held April 27. After transaction of business Miss Fotherby graciously presented the prizes awarded by the committee to 26 members for papers and attendance. The prizes, in the main, consisted of books on technical and educational subjects. The election of officers and committee for next session resulted as follows:—Hon. president, Mr. J. C. Chambers; president, Mr. W. V. Morten; chairman, Mr. W. R. Senior; hon. secretary, Mr. G. H. Sargeant; hon. treasurer, Mr. J. H. Corlett; committee, Misses Fotherby and Parker, Messrs. Niemann, Scutt, Lawrence, Gillett and Baker.

**Liverpool and Birkenhead.**—The seventh and final meeting of the session took place on April 21, Mr. E. S. Francis, president, being in the chair. The occasion being the annual competition night eleven papers were read, as follows:—"Advantages and Disadvantages of the Bank Exchange from a Central Operator's Point of View," by Miss E. Smith; "Order Wire Operating at a C.B. Exchange," by Miss E. F. Nicoud; "A Few Difficulties of the Switch-room," by Miss G. Martin; "Private Branch Exchange Working," by Miss Dreaper; "Hints for Measured Rate Positions," by Miss Quigley; "Telephones and Operators," by Miss L. C. Coffee; "A Few Notes on an Operator's Career," by Miss G. Martin; "Some Causes for Slow Allotment," by Miss A. Walker; "Telephone Work in General," by Miss E. Caulfield; "A Few Thoughts on Supervision," by Miss F. Kerridge; and "Evolution of a Primary Cell," by Mr. Powell. The papers were exceptionally well written and of great interest. Three prizes were competed for, two offered by the society, viz., £1 1s and 15s. open to all members of the staff, and one of £1 kindly offered by the president for the best paper written by a member of the staff in receipt of a salary less than £1 per week. The winners were decided by ballot, Mr. Powell gaining the first prize and Miss G. Martin the second and also the president's prize. At the termination of the proceedings the District Manager, Mr. E. J. Hidden, moved a vote of thanks to the president; he referred in suitable terms to the thorough and earnest manner in which Mr. Francis had carried out the duties attached to this position, and these remarks met with general approval.

**Luton.**—On April 25, Mr. N. A. Saltmarsh, Local Manager, Watford, read his paper on "Works Orders." The question of keeping in local offices unofficial books arose and received a lot of attention. In particular a book for the recording of wire mileage on the various exchanges was thought by a large number present to be necessary. The general discussion was very interesting.

At the last meeting of the session, on May 10, seventeen five-minutes' competition papers were read to a large attendance of members. Eight prizes were given (four by the president, Mr. J. H. Wilson, District Manager), and were won by the following: (1) A. Goodwin, Foreman, "A Few Points to Remember"; (2) J. Leggatt, "Dry-Core Cable Jointing"; (3) M. R. Crawley, "Returns"; (4) L. Sherratt, "Storekeeping"; (5) Miss Nash, "The Telephone Operator"; (6) Miss Stratford, "Operating"; (7) G. Humphrey, "Fitting"; (8) V. Kendrick, "Inspections and Inspecting." A special prize was given to Foreman W. Brown for the best paper on "Underground Construction." The writers are to be congratulated on the general excellency of their papers. A unanimous vote of thanks was accorded the president for the consistent interest he has displayed in the society since its inception three years ago.

**North-Eastern London.**—The sixth monthly meeting was held on April 25 at East Exchange (Mr. O. Morley Ward in the chair), when Mr. G. J. Gadsby read a paper on "The Training of the Telephonist." The subject was reviewed from both the engineering and commercial standpoint, and a strong case was made out for the necessity of workshop training. The paper was followed with great interest by those present, and the discussion was both lengthy and animated. The meeting was unquestionably one of the most successful this society has yet held.

**Nottingham.**—The ninth and last meeting was held on April 29. A paper was read by Mr. S. S. Firth, Engineer, Nottingham, on "Some Notes on Engineering in the Midland Province." The paper was profusely illustrated by lantern slides taken by the author, and was listened to with interest by a large audience. Immediately after the paper the annual general meeting and election of officers took place. The following were elected for session 1910-11:—President, Mr. A. Coleman; vice-presidents, Mr. J. Scott and Mr. C. H. Sibley; hon. secretary and treasurer, Mr. M. B. Oldbury; lantern operator, Mr. E. Robinson; committee, Miss Nelson, Messrs. Aked, Cockrem, Cook, Earp, North and Saywell. At the close of the meeting Mr. Sibley presented prizes for the successful papers in the past session as follows:—Mr. E. Earp, "Transmission"; Mr. E. Gaskell, "Application and Development of Power to Telephony"; Mr. P. R. Cockrem, "Telephone Administration: How it is Organised."

**Oldham.**—A very interesting paper, entitled "A Few Economic Phases of the Measured Rate," was read before a good attendance of members at the Café Monico, Oldham, April 14, by Mr. George Hey, Contract Manager. The president (Mr. W. B. Cheetham) occupied the chair. An animated discussion followed, and the able manner in which Mr. Hey explained the various points raised proved that he had gone very deeply into the subject.

The annual general meeting was held on April 28, Mr. W. B. Cheetham presiding. The officers and committee for the next session (1910-11) were elected. The meeting was well attended; about 30 members, including those from the Stockport and Ashton centres, were present. The business meeting was followed by the society's annual dinner, when a repast of several courses was satisfactorily dispatched. The subsequent proceedings took the form of a smoking concert. Mr. Croasdale's (Ashton) and Mr. Chadwick's elocutionary and vocal efforts were much appreciated. Mr. Collier and Mr. Taylor (in the absence of Harry Lauder and Mr. Maskelyne) enlivened and mystified their audience with "Tobermory" and other favourite songs and feats of legerdemain.

**Western (Metropolitan).**—The last meeting of the 1909-10 session was held on April 27, on which occasion Mr. A. McGregor read an interesting paper on "Exchange Faults." A number of lantern slides loaned from Head Office were shown to illustrate points mentioned in the paper. The following were elected as officers and committee for next session:—President, Mr. E. W. B. How; vice-presidents, Messrs. J. McLeish and A. Wright; hon. secretary, Mr. E. Layton; committee, Messrs. G. E. Boniface, R. H. Drury, A. C. Greening, F. M. Hall, F. Hayden, F. C. Herbert, J. Johnson, R. F. Martin, J. H. Stewart, W. A. Sullivan and F. Woollard.

**Tunbridge Wells.**—The sixth and final meeting of the session was held at the Dudley Institute on May 10, when Mr. Cook lectured on "The Contract Officer and his Work." The lecturer dealt with the duties of the contract officer and the methods which should be adopted in dealing with the public. A discussion followed, and the meeting closed with a vote of thanks to Mr. Cook.

## STAFF GATHERINGS AND SPORTS.

**Bristol.**—A successful whist drive to celebrate the closing of the telephone society session, 1909-10, was held on April 16 at the Cadena Café, when a party numbering 64 spent a most enjoyable evening. Mr. E. Seymour Cooper deserved the hearty vote of thanks accorded him at the close for his active interest in the successful organisation of the gathering.

On April 30 the members of the male staff of Bristol district held a dinner and smoking concert. Mr. E. Seymour Cooper presided and the company numbered 52. After an excellent repast, musical items were ably rendered by Messrs. J. Emlyn Jones, A. T. Mass, P. Shipp, J. T. Smith, W. C. Owen, J. Wilkins, F. C. Taylor, L. Saunders and F. J. Head, and altogether a most enjoyable evening was spent. Foreman J. Allen on behalf of the outside staff said, in a happy speech, he hoped that many such gatherings would be held in the future; this wish was echoed by all present. Mr. V. Jefferies, general secretary A.S.T.E., was also present.

**Cardiff.**—The annual staff dinner was held at Barry's Hotel on April 2. Mr. B. Waite, the District Manager, presided, and about 80 of the staff sat down to dinner. The usual toasts were drunk enthusiastically, the chairman's with musical honours. After dinner a smoking concert was held and a most excellent programme was gone through. Thanks are due to Messrs. T. Lucas, H. N. Garland, G. Bateman, C. Hooper, E. Jennings, E. Reid, J. Jones and W. Evans for the able way in which they contributed towards the evening's amusement.

**Edinburgh.**—The staff held the first ramble of the season on April 30. The route was by train to Gogar, on foot to Balerno via Dalmahoy, returning after tea by Lymphy Grounds to Currie, thence to Craiglockhart and home. Sixty-three were present and a most enjoyable afternoon was spent.

**Plymouth.**—The annual staff dinner took place at Genone Café, Plymouth, on April 29, when 35 members of the staff and friends were present. During the evening the chairman, Mr. G. Hooper, presented the prizes given by the Plymouth Telephone Society for the best papers read before the society during the past session; these were awarded as follows:—First prize, Mr. W. C. Harris, for paper entitled "Instrument Maintenance"; second prize, Mr. S. G. Tregillus, for paper entitled "Stores"; third prize, Mr. F. Knight, for paper entitled "Fitting." A most enjoyable evening was spent. The dinner was followed by an excellent smoking concert, the programme being contributed to largely by members of the staff. The arrangements were carried out by Messrs. Bennett, Evans and Walton.

**South-East Lancashire.**—*Football.*—The final contest for the possession of the cup offered by an anonymous donor for competition between the three centres in the district, under Association rules, was played off before interested spectators at Stockport on April 23. The opposing teams were Oldham and Stockport, and after a very keenly contested game, the latter team proved victorious by four goals to one. The trophy is now in the possession of the champions, who carry both honours and trophy with mingled modesty and pride.

**Swansea.**—A supper promoted by the local engineering staff took place at the Hotel Grosvenor on April 23, when a gathering of about 80 members and visitors attended. Mr. W. E. Gauntlett (District Manager) presided, and was supported by Mr. W. J. Hodgetts (Engineer). An excellent repast was followed by a most enjoyable musical programme, to which several members of the staff contributed. During the interval a silver cigarette case was presented by Mr. Gauntlett, on behalf of the staff, to Mr. E. Wheatley, who recently resigned the Company's service. The committee are to be congratulated on the success attending their efforts.

**Tunbridge Wells.**—A sports club has been formed among the staff at Tunbridge Wells, of which the District Manager, Mr. S. C. Smith, is president. Difficulty has been experienced in finding a suitable ground, but a tennis court has been obtained, and the members hope to turn their attentions to other branches of sport later on.

# THE National Telephone Journal

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No. 52.

## TELEPHONE MEN.

### L.—JOHN DUNLOP WATSON STEWART.

JOHN DUNLOP WATSON STEWART is a Scotsman, having been born in Glasgow on Feb. 3, 1872, and educated first at the public school at Rothesay, in Bute, and afterwards at St. John's Grammar School, Hamilton.

He entered the Company's service at Glasgow on July 25, 1886, when Mr. Dane Sinclair was engineer there, and spent three years in the workshop under Mr. Tom Donaldson, who was, and is, chief mechanic. Probably a larger number of boys have passed through Mr. Donaldson's hands than those of any other man in the service.

On Oct. 31, 1889, Mr. Stewart was appointed Test Clerk at Glasgow, and in March following Local Manager at Falkirk. In December, 1890, he was transferred in the same capacity to Kilmarnock, and two years later became Local Manager at Hamilton.

On the reorganisation under Mr. Gaine in May, 1893, Mr. Stewart was appointed District Manager for the Mid-Lanark district, and in the following year transferred to Greenock. At that time Greenock possessed a generator call - and - clear system, the board in use being of the Scribner multiple type. During Mr. Stewart's stay the exchange was shifted to other premises, a flat board installed, and a call wire system brought into use.

Early in 1896 he was appointed to the District Managership of Aberdeen, where he spent eight years. During that period the Aberdeen and Inverness districts were amalgamated to form the North of Scotland district, which, with its area of some 15,000 square miles, ranks as the most extensive in the kingdom. It is indicative of the ground which it covers that to reach the most distant exchange from the district office involves a journey of eight hours by land and eight hours by sea.

Mr. Stewart's tenure of office at Aberdeen was coincident with the large expansion of telephone facilities throughout the kingdom, and a number of exchanges was opened in the north. Not content with its work on the mainland, the Company sent Mr. Stewart on a canvassing mission to the Orkney and Shetland Islands, the latter of which are distant about a day's sail from Aberdeen. He found

the people there a mixture of the slow-going Scot and the frugal Scandinavian, a combination which proved too much for his efforts to obtain sufficient support for the Company's proposals. More especially in the Shetland Islands are there to be found traces of the Scandinavian influence in the names, features, and temperament of the islanders. These islands, it may be noted, were pledged as security for payment of the dowry of Margaret of Norway, who wedded James III of Scotland.

In June, 1904, Mr. Stewart was appointed to Edinburgh, and the five years which he spent there saw extensive additions to an already well-laid-out underground system, the conversion of the switchboard at Edinburgh Central, and the adoption of central battery working. In the neighbouring burgh of Leith a C.B. switchboard was installed in new premises which had already been taken. The earth circuit system was made metallic and the new system brought into use. The introduction of central battery working at the two largest exchanges in the district involved an extensive replacement of the subscribers' instruments in Edinburgh and Leith, and the equipment of the different sub-exchanges with special apparatus, in order that the full benefit of the improved working at the larger places should be obtained. The switchboard in the old exchange at Leith was one of the original multiple boards. It was installed about 1888, and was to the new board as the stage coach is to the motor car. When the private branch exchange tariff was introduced it was strongly pushed at Edinburgh. The ground was found to be very hard to break, but ultimately an opening was got, and the

new method was taken up enthusiastically by a number of firms, business and professional.

In August last Mr. Stewart was transferred to his present position at Belfast.

Mr. Stewart is pre-eminently a man of system, and takes a keen and sympathetic interest in all that concerns the prosperity of the Company's system, and the well-being of the staff.

His technical experience had the right beginning in the



mechanics' shop and, as above noted, he has had a most varied and useful succession of duties in several districts, subsequent to the usual apprentice period, where he, in common with several others who now hold high rank in the Company's service, was introduced to the several departments of the telephone business.

He is a typical Scot, with well-settled opinions on most things, opinions which are always thought out with care and intelligence.

In his recreations he is essentially an out-of-door man, and finds some of his greatest pleasures in walking, fishing, and hill-climbing. He dabbles in photography and, need we add, plays golf.

### THE TELEPHONE MASONIC LODGE.

UPWARDS of 100 brethren attended the third installation ceremony which took place at the Gaiety Restaurant, London, on May 28. Previous to the installation, Messrs G. T. W. Salisbury, E. J. Whibley, H. J. Loney, G. E. Nicholls and J. W. Ullett passed through the ceremony of initiation. The Worshipful Master, Bro. P. P. Kipping, also presented a jewel to Bro. P. J. T. Kenney, on behalf of the officers and brethren, as a mark of their appreciation of his valuable services as first secretary of the lodge.

Bro. Stanley J. Goddard, S.W., was then installed as Worshipful Master for the ensuing year by W. Bro. P. P. Kipping in a most able manner, for which he was specially thanked. The newly installed Worshipful Master appointed his officers as follows:—Bros. F. A. B. Lord, S.W.; P. J. T. Kenney, J.W.; C. E. Tattersall, treas.; F. O. Harke, L.R., sec.; A. F. Paddon, S.D.; W. M. France, J.D.; C. E. Wetton, P.P.S.G.D., Middx., D.C.; W. J. Downes, A.D.C.; V. Baldwin, org.; J. E. Pullin, I.G.; F. E. Sims, R. H. R. Kenway and J. R. B. Gall, stewards. In presenting W. Bro. Kipping with a handsome P.M. jewel, on behalf of the lodge, the Worshipful Master said he hoped he would live many years to grace the lodge with his presence and give the benefit of his great experience. A sum of five guineas was voted for the relief of the sufferers in the Whitehaven Colliery disaster.

The brethren afterwards dined together under the presidency of the newly installed Worshipful Master, and amongst members and visitors present were V. W. Bro. Jas. Stephens, Pres. Bd. of Ben.; W. Bros. J. Taylor, P.G.D.; G. C. Kent, P.A.G.D.C.; J. Gordon Langton, P.D.G.D.C.; J. F. Roberts, P.G.Swd.Br.; Chas. H. Stone, P.A.G.P.; J. M. Bathgate, L.R.; A. Findlater, P.P.G.D., Middx.; W. W. Mansfield, P.P.G.D., Middx.; T. Caparn, P.P.G.D., Hants; J. C. Ozanne, P.G.S.B., Guernsey; R. McLean, P.G.S. of Works, Guernsey; E. Lockwood, L.R.; A. M. Barnard, L.R.; A. P. Crabb, L.R.; Thos. Fletcher, P.M.; W. Phelps, P.M.; and Bros. A. E. Bennett, S. D. White, F. E. Benest, W. Heilbuth, A. E. Ruddock, D. McIntosh, A. Pugh, H. Davis, W. V. Morten, C. H. Sibley, J. Scott, W. Noble, etc., etc.

Letters of regret were read from Rt. Wor. Bro. Lord Balfour of Burleigh, K.T., P.G.W.; W. Bros. J. M. McLeod, P.G.Swd.Br., secy. R. M. Inst. for Boys; R. Percy Simpson, secy. R. M. Inst. for Girls; and other brethren. During the evening W. Bro. Geo. Franklin, P.P.G.W., West Yorks, telegraphed to the Worshipful Master: "Heartily good wishes on your accession to the chair, together with happiness and prosperity to the brethren who will, I hope, excuse this antiquated method of communication."

In responding to the toast of the "Grand Officers," Bro. Jas. Stephens, Pres. Bd. of Ben., said it gave the grand officers the greatest delight to be present to witness the splendid prosperity of the lodge. He was particularly pleased to hear that Bro. Kipping was about to take up as a steward to the Girls' Institution the magnificent sum of £250 from the lodge, showing that he and others had not lived for themselves alone. Bro. J. Gordon Langton, replying on behalf of the visitors present, expressed his great pleasure at witnessing the installation of W. Bro. Stanley J. Goddard, whom he initiated only five years ago. W. Bro. E. A. Fisher also ably responded to the toast.

The Telephone Lodge of Instruction, which was recently formed, has adjourned its meetings till September.

**Telephone Men XLIX.**—In our notice of Mr. Gilmour last month we regret that "cautious" appeared by a printer's error for "courteous" in the last paragraph but one.

## THE OPERATING OF SUB-EXCHANGES AND OUT-CENTRES.\*

### TACT AND COURTESY.

By MARGARET HARFORD FRYER, *Trowbridge.*

I BRACKET these two essentials as the subject of the first part of my paper, as they are of paramount importance, and the key to successful operating. Many are the times when sub-exchange operators find it necessary to exercise tact and courtesy, and I should like to give a few instances in every-day operating calling for the exercise of these qualities.

A subscriber frequently comes on the line in a great hurry, asks for a number in an agitated manner, but is informed that the number he requires is "temporarily out of service," or perhaps that the junctions are engaged. In some cases the subscriber fails to understand the expression used, and tact and courtesy are required in order that the delay shall be satisfactorily explained to him.

Co-operation naturally suggests itself, and this I am appealing for on behalf of the subscriber and the operator.

Subscribers seem generally to hold the opinion that the more furiously they ring the more expeditiously they will be answered. It is, indeed, a pity that this is so, and that some means cannot be found to illustrate to subscribers the fallacy of this theory, as it would save the operators many a headache during the course of a busy day.

### THE SUB-EXCHANGE FROM THE INSIDE.

By MABEL LAWRENCE, *Brislington.*

I STRONGLY advocate the sending of central exchange operators to sub-exchanges with the idea of educating them in the peculiar difficulties of sub-exchange work.

A sub-exchange operator, to start with, must be her own clerk-in-charge to a certain extent, and in an emergency must decide what to do quickly, having nobody in authority to refer to. This in one way is an advantage, as it gives her confidence in herself.

A prevalent idea is that the operator at a sub-exchange is liable to get into the subscribers' ways; but this is not so, as she finds it to her—and to their—benefit to train them into her system.

The sub-exchanges are worked on a different system to the central exchange, and it is occasionally very difficult to get the user of a telephone to grasp the fact that the handle must be turned before taking off the hand set; also that there is a spring which it is necessary to press while speaking. We have to depend on the subscribers ringing off by turning the handle, and failure to carry out this is a great hindrance.

Has anyone else met the man who is most indignant on being asked for the usual penny, declining to pay on the ground that the sign stated "public call office"? Nothing would convince him that the Company were not wilfully misleading the public on the matter.

### SUB-EXCHANGE OPERATORS AND SUBSCRIBERS.

By DAISY V. HAZELL, *Portishead.*

IN the case of many sub-exchanges the operator is known personally by some of her subscribers, but this should not cause any difference in her manner to them.

Continually dealing one with the other should result in mutual understanding and a feeling of interest between operator and subscriber, and where that result is obtained benefit all round is derived.

The operator knows how to treat her different subscribers according to their peculiarities and thus trust in the operator arises.

If, however, in the heat of the moment, subscribers abuse the operator, who is perhaps at her wits' end to get things right, a

\* Extracts from papers read before the Bristol Operators' Telephone Society.



feeling of righteous indignation is apt to fill the heart of the poor girl and a certain amount of friction naturally arises.

I should like to say that were all subscribers to visit their exchange they would see for themselves what an operator has to do, and this would probably cause them to be a little more patient in their manner, realising that the operator does her best for them in every possible way.

### TRAINING A SUBSCRIBER.

BY MABEL BAIJENT, *Chippenham.*

I EXPECT if some subscribers heard us say we were trying to train them they would feel a little annoyed.

But after all we have to train them, and very hard it is sometimes, as each subscriber has to be dealt with in a different way. Some you cannot train, no matter how you try, while others soon come into line, realising at once that you only wish to treat them in a business-like manner.

To an operator in a small town it is very much harder to adhere to the correct expressions, because she is generally personally known to her subscribers, who, consequently, do not treat her as "the exchange girl," but as a personal friend. As an instance of their method of giving calls one may receive in reply to the operator's "Number, please?" "Oh, is that you Miss A? Good morning! How are you? Would you mind putting me on to Mr. Brown? I'm sorry, I don't know his number!" Then, again, I have had subscribers ring up and say: "Is that you, Miss A? Are you busy for a moment? Here is my little boy. He wants to speak on the telephone. Do you mind speaking to him?" What can one do in a case like that?

I would like to say a word for the travelling supervisor, as I am sure every sub-exchange operator is grateful for her assistance. It is pleasant to be able to turn to her for instruction and advice, and much benefit is derived from her periodical visits.

### HAPHAZARDS.

BY PHYLLIS MARY KINGSMITH, *Swindon.*

JUST over two years ago the telephone was to me, literally, an "unknown quantity," and my first impression of a switchboard was that it was "fearfully and wonderfully made," and the more I learn of telephony only intensifies that impression.

I think that patience and good temper are the most essential qualities an operator can possess, but they are often sorely tried by the careless and thoughtless way some subscribers use, or misuse, the telephone. In fact, some subscribers have not even the rudiments of common courtesy, judging by the way they address an operator. On the other hand, there are subscribers whom it is a pleasure to serve, as they are invariably courteous and considerate to the operator.

The commonest errors of subscribers, I find, are (1) not ringing off when their calls are completed and (2) asking for the subscribers they require by name instead of number.

As a method of curing them of the former irregularity the best way is, I think, to fetch them back to the telephone, probably after they have comfortably re-seated themselves in their armchairs, and politely inquire, "Have you finished?"

### THE USE OF STALLOY METAL IN TELEPHONY.

BY R. M. CHAMNEY, B.Sc., *Engineer-in-Chief's Investigation Department.*

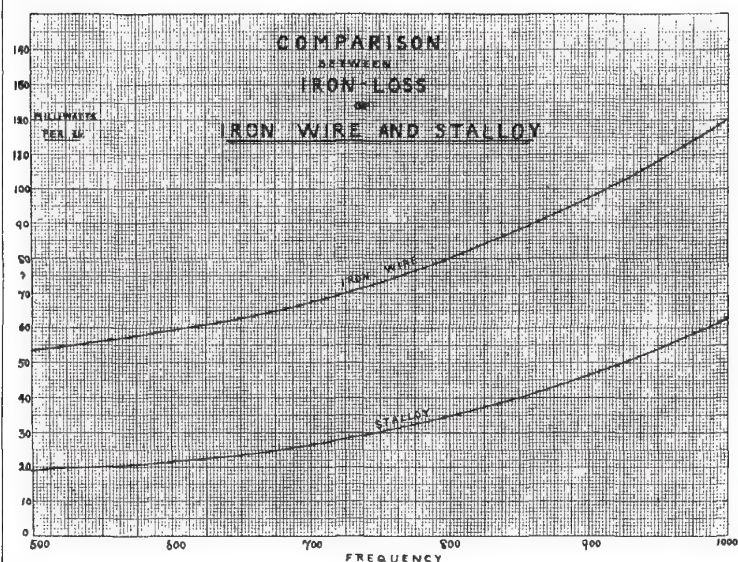
STALLOY metal is a steel alloy brought out by Sir Robert A. Hadfield a few years ago, its chief characteristic being the addition of 3 per cent. of silicon. This increases the resistivity of the alloy to about three and a half times that of ordinary transformer iron, so

that the eddy current loss, when it is used as part of an alternating current magnetic circuit, is greatly reduced, and this point seems to be the most important as regards telephony. The hysteresis loss is also very much less than with ordinary iron. The permeability of stalloy is larger than that of iron for the small values of  $B$  used in telephone work, and it reaches a maximum of 4,500 for a value of  $B$  of 5,500. For this reason smaller cores of stalloy can be used, thus still further reducing the loss.

A curve has been got out by Mr. G. M. Shepherd, of the Investigation Department, showing how the total iron loss of both iron wire and stalloy vary with the frequency. This curve was obtained by means of cores of the two metals being tested in a No. 23 induction coil. It is interesting to note that the loss with the latter is on the average about half that with the former over the range of frequency given.

In the actual test the induction coil was supplied with current from a small high-frequency alternator which gives as nearly as possible a pure sine-wave, and the secondary coil was on open circuit.

Induction coils with cores of stalloy were tried to see whether there was any improvement in transmission, but only a very slight difference was noticed.



A large number of tests have been carried out with diaphragms made of stalloy metal in both C.B. and L.B. H.M.T. receivers, and a very fair improvement was noticed in each case. The method of testing was as follows:—

A receiver was tested for its allowance with its ordinary diaphragm on the standard C.B. circuit; a stalloy diaphragm was then substituted for the ordinary one, and the allowance again taken. In order to eliminate any error due to the diaphragm being placed differently in the receiver, both of the two tests were repeated; the mean of the first and third tests being taken as the allowance with the ordinary diaphragm, and the mean of the second and fourth tests being taken as the allowance with the stalloy diaphragm. The difference of the two means for a large number of receivers gives the improvement.

A large number of these new diaphragms are being issued to Head Office and Salisbury House (C.B.) and the Bishop's Stortford and Cromer areas (L.B.) for durability tests. Half of the receivers in these areas are fitted with new stalloy diaphragms, and the other half are fitted with new ordinary diaphragms; and by noting how often faults occur due to these diaphragms and how often renewals are required, the relative durability will be obtained.

Another interesting point as regards stalloy is that its temperature co-efficient is only '001, whereas that of ordinary iron is about '006.

## PROMOTION.

By G. F. B. G.

THE interest taken by the staff in the subject of promotion and in the means by which advancement may be obtained is in itself a sufficient reason for bringing the subject into prominence by means of the JOURNAL.

Promotion should be made entirely on the basis of a man's fitness for increased responsibility; it is therefore best striven for by studying and cultivating the qualities necessary for the position aimed at. A great deal of hard work is sometimes done in the hope of promotion without any very definite idea of the goal to be reached. This is of little use; it is necessary to concentrate and specialise on the work most suitable for the position in view. But specialisation must not be carried too far. It must not be allowed to narrow a man's efforts to such an extent that he becomes fit for nothing else but one position, for openings often occur in directions other than that expected. Training should therefore be directed to the broadening and development of character as well as to the acquisition of the knowledge necessary for the class of work in which one is engaged. For promotion involves new and enhanced responsibilities, and it is the man who is best fitted and equipped to bear these who will be chosen. Fitness and equipment here mean the possession of character and ability suited to the position. Under these two main headings, character and ability, we may consider the whole of the qualifications for promotion to be grouped. Of the two, the former is of the higher importance for strength of character can create ability, but knowledge and skill, though they may assist, are incapable of remedying a weak and indecisive character.

The selection of men for promotion is one of the most important duties devolving upon those charged with the administration of a large undertaking. It involves a very heavy responsibility, for the men they select will exercise a great influence on the conduct of the business, and the methods they employ in making the selection will have important effects on the morale of the staff.

The problem of selection resolves itself into that of forming an accurate estimate of character and ability. Before discussing the methods of making the selection it will be well to consider briefly the requirements under these two headings.

It has already been said that character embraces the more important qualifications. Many of the virtues which go to make up a first-class character will readily occur to everyone. Honesty, however, deserves special mention, because this virtue, above all others, is a most essential part of character. Whether exercised in the handling of property or in the use of time, or in dealings with other men, it carries with it the attendant virtues of reliability, truthfulness and zeal. Many other attainments, such as common sense, tact, courtesy, and others, some of which are natural and some the result of careful training, might be mentioned, but the list is a long one. Suffice it to say that the man to be promoted should have a character which has earned for him the confidence of his colleagues and employers. There is one trait which should be mentioned before leaving the subject of character. This is really a defect somewhat difficult to describe, and still more difficult to foresee. We refer to the cases in which the aspirant's enthusiasm and effort are induced only by hope of promotion, and vanish as soon as the position is attained. This is a failing which should be very carefully guarded against; many a disappointed candidate may find in it a reason why some rival, apparently making less strenuous efforts than himself, was selected.

Although ability cannot be considered of so great importance as character it is by no means to be dispensed with. Included in it are knowledge and skill, but both these are useless without that quality which enables a man to bring them into direct application to his work. This is the reason why experience is so valuable, for the knowledge and skill derived from experience have arisen from the work itself, and so are in a form fit for direct application. Ability admits of less general discussion than character, since the qualifications coming under the former head are entirely dependent on the class of work. The knowledge and skill to be looked for in

promoting a lineman are widely different from those to be looked for in a contract agent.

The essential qualifications necessary in an aspirant for promotion having been briefly considered, one or two of the methods adopted by different administrations in making the selection can now be dealt with.

The ancient and simple method of selection was by length of service; happily it is now almost extinct. Among primitive tribes it may have resulted in the best man being made chief, for with them the only road to knowledge was through experience, so that he who had lived longest was best equipped. But in civilisation, with its many opportunities for education and its devices for protecting the weaker members of the community, selection by length of service only cannot result in the promotion of the best men. Yet experience and practice are no little matters, and long service gives an authority which a younger man finds it difficult to exercise.

Modern conditions demand a less empirical and automatic means of estimating a man's capabilities. There are so many factors involved of such a varying importance that any arbitrary test is worse than useless. We each have our opinion, perhaps a little indefinite, of every other member of the staff with whom we have come in contact; this opinion is based on the sum of our observations of his behaviour and work. A good chief will seek to form as definite and accurate an opinion as possible by careful observation and study of his staff, so that his men will be selected for promotion, not arbitrarily or empirically, but on the basis of an estimate which sums up the multifarious items included under the terms character and ability. A man's work, carefully and sympathetically studied, is the best guide to his ability; it indicates not only whether he has knowledge, but, what is more important, whether he has the power to apply it. As for character, if character is a bundle of habits, what can be a better guide to it than a watchful study of the habits which make it up?

This principle of selection places the whole responsibility of making the choice on the head of the department, and exposes him to the charge of favouritism. There are two ways in which attempts have been made to avoid this. One is by means of a special independent test of the candidate's capabilities by examination either written or *viva voce*. This is the method recently adopted by the Post Office. If we judge it by the extent to which it enables one to form an accurate estimate of ability and character, it is undoubtedly bad. No one would suggest that a written examination is other than a useless and very misleading test of character; while men who meet the candidate for a week's *viva voce* examination cannot possibly form such a reliable opinion as the men for whom and with whom the candidate has worked for years. Nor can an artificial and special test give a proper insight into a man's ability; it can to some extent test his knowledge, but knowledge is of use only so far as it can be applied, and an examination is a poor test of a man's power of applying what he knows. No matter how much his knowledge may be, if he cannot make it evident by applying it to his daily work, it can fairly be assumed that it is useless. Of course, it is of purely technical knowledge that we speak; we are not concerned here with the broadening of character resulting from a good general education.

It cannot even be claimed that examinations test a man's real knowledge; it is extremely difficult, if not impossible, to devise an examination in which some advantage is not to be gained by "cramming." It has been urged that the ability to "cram" shows a quick and retentive memory, and should therefore quite rightly count to a candidate's benefit. Perhaps so, but is it right to allow a minor facility, such as the power of memorising, to have so great weight as to belittle the importance of all the qualities comprised in character?

The advocates of the examination system claim that it encourages a man to read up subjects relating to his work and to study it from the theoretical point of view. Such study is, of course, desirable and necessary, but to stimulate it by examinations only tends to distort a natural means of acquiring knowledge and to place a false value on mere academical proficiency.

A man's real knowledge is not the specially acquired text book knowledge on which most examination papers are set; it is the information on which he has as certain a grip as on his multiplica-

tion table. This is the knowledge which is of use to him and his employers, and until his text book knowledge has been digested and absorbed to this extent it will find little expression in his work.

Even for knowledge, then, the unwritten record of the candidate's daily life and work is the best test. By the side of this examinations are unnecessary, and worse than unnecessary, for they lead to a man's fitness being estimated on what is only a very small proportion of all that should be taken into account.

And what of the effect of the examination system on the staff? Apart from the irritation and discontent which inevitably accompany any examination, there is a very serious repressive effect on the energies of the staff. Everyone admits, of course, that competition for promotion is good, but when that competition is decided by an artificial and individual test of a man's knowledge, the stimulating effect of competition is replaced by a selfish and jealous attitude which refuses help to a colleague for fear that the knowledge imparted may mean the loss of a few points' headway in the examination. The man who is best capable of filling a superior position is obviously not a man who succeeds in keeping most of his knowledge to himself, but a man whose nature is to help, advise. Only his employer and his colleagues can estimate this quality; as proof is needed of the increased efficiency of a staff whose every member knows that the extent to which he helps his fellows is taken into account in his claims for promotion.

The other method by which the placing of the whole responsibility on the head of the department can be avoided is the simple and rational one of taking into account the opinion of others of the candidate's seniors who have had opportunities of studying him perhaps to a greater extent than his chief. The responsibility is no light one, nor is it fair to the employee that his promotion should rest with one man only. Apart from all suspicion of bias or favouritism an incorrect estimate of the man's fitness will mean loss to his employers in any case, and it may stand in the way of the advancement of a man who is thoroughly worthy of promotion.

It is not difficult to see what an improvement such a system creates in the staff. Each man strives to make himself as useful as possible to his chief and his fellows, knowing that on his chief's opinion depends his future advancement, yet fully aware that any false impression he may create on his chief will be dispelled by his colleagues. Knowledge he will get not because he is compelled to acquire it, but because he feels the need of it; ability in applying it will come from practice in working out his own problems and assisting his fellows in theirs; his character will be moulded by the continual desire to make himself useful, efficient and respected. Finally, the men selected will be those who have won the good opinion of their chief and colleagues not by some artificial and arbitrary test, but by proved ability and consistently loyal conduct.

## REVIEW.

*The Practical Telephone Handbook.* By Joseph Poole, A.M.I.E.E. (Whitworth Scholar). Whitaker & Co. Cloth, 600 pp., 6s. net.—We have just received the fourth edition of the handbook from the publishers. Mr. Poole's book, which has been thoroughly revised, is a standard work on the subject of telephony and is too well known to call for detailed criticism. It covers all the main branches of telephone work from the first principles of electricity and magnetism down to the complicated apparatus of the automatic exchange. The new edition contains some 70 additional pages, including new chapters on Submarine Telephone Cables, on Later Post Office Exchange Practice, on Development Studies, and on Wireless Telephony, whilst the chapter on Automatic Exchanges has been considerably extended. The information in the Appendix has also been increased, and includes some very useful facts and figures. The book is well illustrated, the blocks having been increased in number from 473 to 530. The diagrams are very clear and exemplify the latest practice, but we think some of the larger half-tone blocks might have been better printed. We recommend the book most confidently to all our readers; it is a work no telephone man can afford to be without.

## THE TELEPHONE LOAD LINE.

By H. DEANE, Assistant Traffic Manager, London.

(Continued from page 49.)

TABLE C.

JUNCTION VALUATIONS AT PRESENT ADOPTED BY THE METROPOLITAN TRAFFIC DEPARTMENT.

Exchanges with	1-10 outgoing junctions.	Junction valuation	- 2'2
"	" 11-20	"	" 2'1
"	" 21-30	"	" 2'0
"	" 31-40	"	" 1'9
"	" 41-50	"	" 1'8
"	" 51-60	"	" 1'7
"	" 61 and upwards	"	" 1'6

As regards the value of incoming calls, I prefer to refer to this when I speak of "B" operators' loads.

One of the most controversial traffic problems is what should be regarded as an "A" operator's hour load when she works at her maximum efficiency. This load is usually referred to as being equivalent to so many local calls during the hour. There can be little doubt that the usual standard—namely, 100 local calls per half-hour or 200 local calls per hour—has to a great extent been accepted because these are figures which facilitate calculations. It has always been recognised that such a load is a fair load, and not necessarily what particular operators can handle or even what average operators can attain under certain conditions. Anyone can satisfy himself concerning the former point by comparing the position register readings at an exchange where the distribution is known to be on good lines. "A" operators vary considerably in efficiency, and considerable differences will be noticed in the loads dealt with by each when all the positions in an exchange are filled. When we speak of an average hour load of 200 local calls per operator, we should always bear in mind that some operators are doing considerably more work than others, and that even were "A" operators equally efficient such a load can in no way be regarded as a maximum load. It is a load which can be satisfactorily dealt with, with certain objects in view, and which can easily be exceeded on particular occasions.

Now, when we speak of an average hour load of 200 local calls per operator, we imply something which some lose sight of. We mean that if such a load is maintained, and if our supervision and exchange organisation are on a sound basis, a certain standard of service will result therefrom. In certain cases questions of policy arise that require "A" operators to deal with a higher load than the standard; but then we are perfectly prepared to see the service suffer to some extent. The standard of service which we expect from a C.B.1 exchange is that the average time of answering subscribers' calls shall be 4.5 seconds; that the average time of clearing connections when the clearing signal is given shall be 4.5 seconds; and that the percentage of operating irregularities shall not exceed 18 per cent. We are of the opinion that we can do this with the existing amount and system of supervision. Of course, were it desirable to increase that supervision, we could raise the standard of service, without in any way affecting the standard hour load of operators.

If we accept the average time valuations of calls at C.B.1 exchanges in table B as representative, it can easily be shown that an "A" operator is only actually operating during 60 per cent. of an hour when she is working at her maximum efficiency. We see, therefore, that a load of 200 local calls per hour affords her considerable margin. On the other hand, we must remember that an operator cannot be compared with a machine which can work continuously during a given period. Even if an operator had absolutely nothing else to do than to operate, we could not expect her to account for every second in the hour. An operator has, as a matter of fact, a good deal to do besides what may be termed productive operating. She makes ineffective attempts on her initiative to effect calls, she answers speed of answer tests, listens on the instruction circuit, has to answer false calls, to deal with permanent glows and with subscribers who complain of being rung in error. She has to refer certain ineffective calls to the monitor for completion, to report faults, junction delays, cases of



subscribers who are cut off and of wrong numbers connected by "B" operators. Inspectors also test lines with operators, and when it is necessary for operators to ring on lines and answer questions relative to the "hearing" considerable time is sometimes sacrificed. Traffic men who deal with operators' loads should consider these points very carefully.

I suppose it will never be possible under such conditions to calculate what an operator's hour load should amount to. In those cases where we are fairly confident of the junction call valuation experience shows that the present standard for C.B.1 exchanges is a fair one. I have up to the present referred to this standard as being equivalent to so many local calls during an hour or half-hour. If our junction valuations are correct, it should theoretically make no difference whether we speak of so many local calls or valued calls. In view of the fact, however, that certain exchanges with a small percentage of junction working are apparently able to deal with higher loads than the standard with comparative ease, some traffic men think that even if we have ascertained the exact relation between the local and junction call, there is something in addition at exchanges with a large percentage of junction working which has to be accounted for. They argue that at an exchange with, say, 95 per cent. of local working, operators have such simple straightforward work to carry out that it almost becomes mechanical; whereas, at exchanges with, say, 20 per cent. of local working and a complicated junction system, there is some factor that comes into operation which results in the operators more frequently being taken at a disadvantage.

One sometimes hears that because certain conditions have changed during a given period, the standard load at a C.B.1 exchange should be raised from 200 valued calls during the busy hour to 220 or 230. However convenient it may be to adopt this language it is wrong reasoning and implies an ignorance of junction valuations. It will be evident, I think, that if we at any time adopt a standard of 200 local calls per hour there can only be one thing which will cause this load to increase—namely, the time value of the local call decreasing. The tendency of this time value at large exchanges is rather to increase than to decrease, so that, in reality, at such exchanges, we should decrease the number of local calls representing the standard rather than increase it.

What really happens is that the average junction call valuation is falling. The figures in table B tend to confirm this. As a result, although the standard expressed in local calls remains the same, operators are able to deal with more actual calls than before on account of the time value of junction calls being lower.

Now if we say that an "A" operator at a C.B.1 exchange can operate during 2,284 seconds in the hour (that is, the average local call valuation 11.42 seconds multiplied by 200) we can also say that at such an exchange as Avenue, where the local call valuation is 12.14 seconds, "A" operators can only deal with 188 (or, say, 190) local calls per busy hour. In addition, we must be careful to adopt the correct "junction call valuation" for such an exchange. Table D shows the busy hour standards we at present adopt at different types of exchanges.

TABLE D.

"A" OPERATORS' STANDARD "BUSY HOUR" LOADS.

Type of switchboard.	"Busy hour" load expressed in local calls.
C.B. (1) }	
C.B. (10) :	200
C.B. (9) ..	
Magneto (self-restoring indicators) }	190
Magneto (hand-restoring indicators) ..	160

In table E we have certain time valuations in connection with incoming calls at C.B. exchanges. Before I discuss whether there is any relation between these values and the load a "B" operator can take, I should like to draw attention to an important distinction that exists between an "A" and a "B" operator's work. As there is team work on "A" positions it is possible for an "A" operator to start with a small load and gradually attain proficiency. Now a "B" operator must take the load her position demands. She cannot be helped by others except to a very limited extent in disconnection. That is the reason why the "B" should always be a senior operator. If we expected a "B" to operate for the same number of seconds in the hour as we expect an "A" operator to

operate, we should find that very high loads would be taken when compared with the loads which are actually taken. It is important however, to distinguish between the nature of an "A" and a "B" operator's work. A "B" operator's operating is practically a repetition of the same kind of work, but it is work which requires considerably more physical exertion than that of an "A" operator. Also, it is work of such importance that unless it is extremely accurate, any inaccuracy will react upon the "A" operator. It is also necessary that "A" operators shall not be delayed in the use of an order wire. Consequently it is very desirable to safeguard against rushes on order wires. Every rush means delay to some operators. These are the chief reasons why we cannot expect "B" operators to actually operate during the same percentage of the hour as "A" operators do. A "B" operator is, to a great extent, dependent upon circumstances; she cannot occupy her time to the same advantage as an "A" operator.

TABLE E.

TIME VALUATIONS OF INCOMING CALLS AT C.B. EXCHANGES: FROM OBSERVATIONS TAKEN DURING MARCH, 1909.

Order wire calls:	Seconds.
From the moment a junction is allotted until the control is depressed .. .. .	2.24
From the moment a junction is allotted until connection has been made to engaged signal ..	3.38
From the moment the "B" operator commences to clear until cord is guided back to socket or junction is re-allotted .. .. .	1.04
Average value of incoming call (20 per cent. subscribers engaged) .. .. .	3.51
Signal junction calls:	
From the moment "B" operator enters circuit until control is depressed .. .. .	5.78
From the moment "B" operator enters circuit until connection has been made to engaged signal ..	5.64
From the moment "B" operator commences to clear until cord is guided back to socket .. .. .	1.14
Average value of incoming call (20 per cent. subscribers engaged) .. .. .	6.89

There is no theoretical connection between a "B" operator's load and the carrying capacity of the junctions connected to her position. Everyone is now familiar with the general principles that the number of calls a junction can carry during an hour is dependent upon the average length of junction connection; and that the more we increase a group of junctions, the greater is the carrying capacity of each junction in the group. Suppose now a group of junctions, fully worked during the busy hour, corresponds to a particular number of connections on the "B" operator's part, which work represents a fair busy hour load. For some reason, let it now be supposed, the average length of junction connection decreases. Each junction will, in consequence, be able to carry more calls per hour. The group of junctions need therefore not be increased until its carrying capacity is exceeded under the new conditions. Although, then, the number of junctions under the control of the "B" operator in question has not been increased, a greater load is demanded of her. If her previous load was considered a fair load, her new load will be an overload. She cannot, in consequence, maintain the same standard of service rendered to "A" operators. The correct procedure in this case is to decrease the number of junctions under her control. Suppose now the average length of junction connection remains constant and that in process of time the junction group increases so as to cover two "B" positions. The "B" operator attending to the first order wire will now be dealing with a higher load than before, because the carrying capacity of each junction has increased. The question arises whether this is a similar case to that I have mentioned above, and whether, in consequence, we should reduce the group of junctions under the "B" operator's control? Both reasoning and experience show that this is not a similar case, and that such a "B" operator can take a higher load than before. The explanation is that the "A" operators having now two order wires which they can use are carrying out something in the nature of team work which "B" operators cannot carry out between themselves. In a word, the "A" operators are making the "B" operators utilise their time to better advantage, which they cannot, by taking thought, do of their own accord.

Of course there must be a limit to a "B" operator's load.

When this is reached, we must decrease the junctions per position and restrict the number of "A" operators using the order wires that exist by bringing into use other order wire positions.

It is as well to bear in mind that the magnitude of a "B" operator's load is, until we reach her physical limit, dependent upon the service which we expect "A" operators to receive when they use an order wire. This explains the reason why we cannot expect "B" operators attending to split order wire positions to handle the same load as "B" operators attending to straight order wire positions. "B" operators attending to the former positions find it more difficult to assign junctions belonging to various groups; and, if we did not take into consideration the slight delays in the assignment of junctions on a split order wire position, we should only encourage the possibility of order wire rushes, reacting in their turn upon "A" operators, and consequently upon the service.

The study of "B" operators' loads, under different conditions, affords an enormous field to the traffic expert.

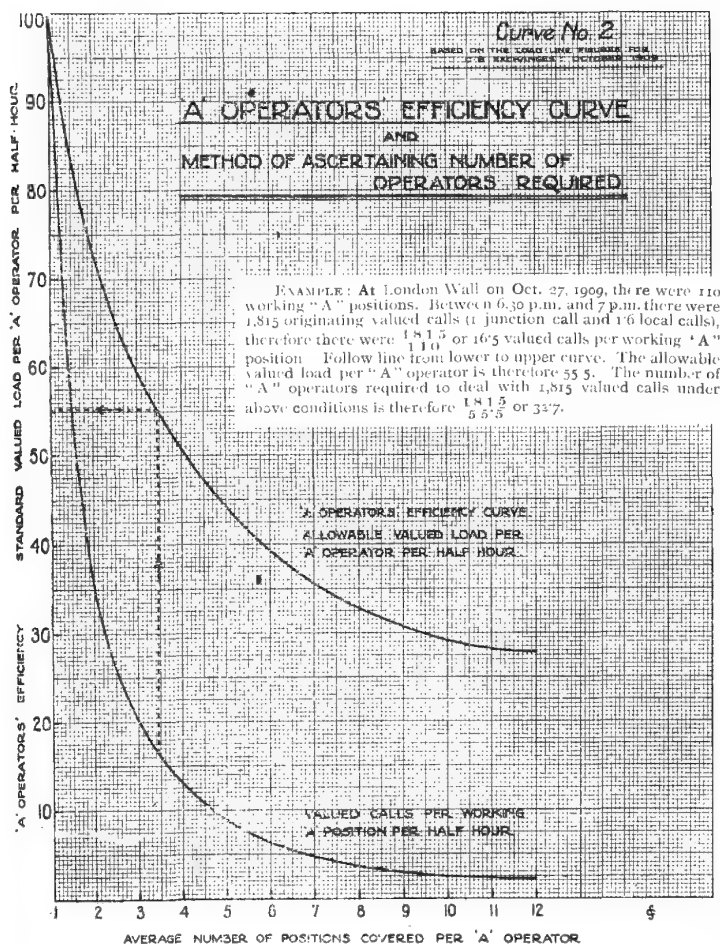
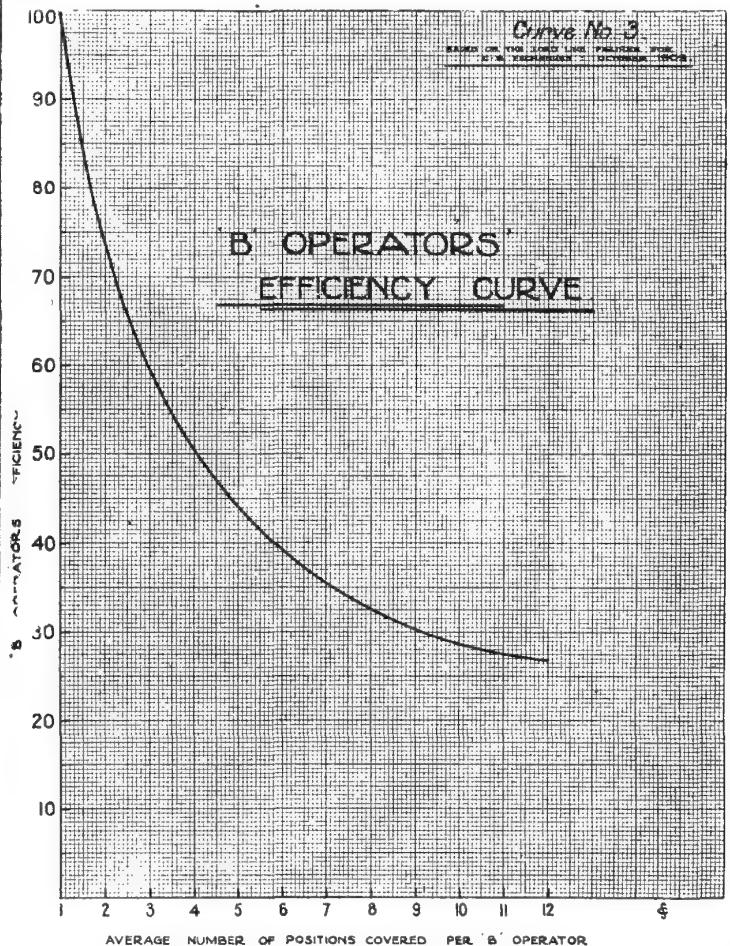
TABLE F.

"B" OPERATORS' "BUSY HOUR" LOADS: C.B. (I) EXCHANGES.

Number of order wires incoming from one exchange.	Number of exchanges connected to the same order wire.	"Busy hour" loads.
6 or more	—	490
5	—	475
4	—	460
3	—	440
2	—	410
1	1	350
—	2	340
—	3	325
—	4	300
Signal junction position	—	140

I should like to conclude this particular subject by saying that the actual setting up and taking down of connections does not constitute all the "B" operator's work. The connections she

establishes are not equivalent to the applications she deals with. She has sometimes to say "No lines," to ring on junctions, to change them, to deal with cases where "A" operators are obviously on the wrong order wire or have taken wrong junctions; and she is often forced to demand a repetition of the application.



With regard to the relation between an "A" operator's efficiency and the number of positions she has to cover, it has been recognised for some years that some connection exists between the two. Whether this relation can be worked out scientifically is a problem for the traffic expert. Such a problem would involve the determination of the amount of team work that an operator carries out when she covers one position, and how this is affected when she covers more than one position. The number of calls which an operator answers and which originate at her own position, when she is working at her maximum efficiency is, in London, lower than might be supposed.

We are forced, therefore, to ascertain what actually takes place in practice and to adopt this as our standard, in the absence of a scientific formula. This is, as a matter of fact, an excellent method, especially if we feel sure of the efficiency of our exchange organisation. An exchange official, to put the matter in plainer language, feels fairly certain whether, at a particular time, for example, six operators are sufficient or whether a seventh is required. Curve No. 2 is based upon this practical experience.

The upper curve, which is an "A" operator's efficiency curve, is based upon the load line records taken at the C.B. exchanges during the last week in October, 1909. The value of such a curve would naturally be increased if it could be based upon all the load line records taken at C.B. exchanges in the kingdom. For London, at any rate, it may be taken as a fairly safe guide. When the matter is considered correctly, this curve, after all, is only an illustration of the principle that each C.B. exchange should strive to do as well as the average if its efficiency falls below it,

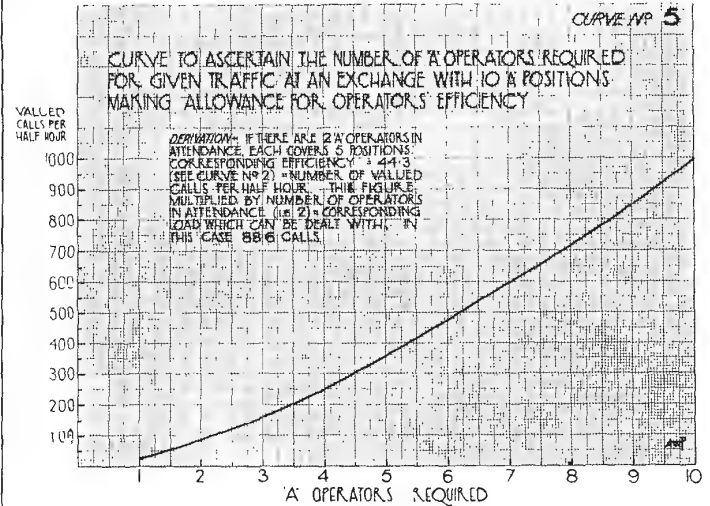
It will be seen that when an "A" operator covers one position only, she is at her maximum efficiency, and that this efficiency falls to about 28 per cent, if she covers twelve positions. It will also be noticed incidentally that the usual standard valued load expected of an "A" operator during half an hour when she is working at her maximum efficiency corresponds with the figure representing that maximum efficiency.

Curve No. 3 is an efficiency curve for "B" operators calculated for the same exchanges, and is wonderfully similar to curve No. 2.

We are now in a position to represent the load line record in graphic form, and to calculate what staff is necessary to deal with the traffic.

Everyone is familiar with the general aspect of a load line curve for a London exchange. It is plotted for each half-hour between 8 a.m. and 8 p.m., this being the usual time during which the day operating staff is on duty. The average number of "A" operators during each half-hour is also shown. So far, these two quantities—namely, the valued originating traffic and the operating staff—are actual facts; and if an operator's efficiency did not vary with the number of positions she covered, it would be a very easy matter to ascertain what staff was necessary to deal with the traffic half-hourly throughout the day. In fact, if we were not particular concerning the standard of service remaining constant, we might simply supply the operating staff which the load line curve showed was directly necessary. But this direct method is not sufficient for our purpose during the slacker times of the day,

if we wish to maintain our standard of service. The method we must adopt is clearly shown in curve No. 2. The lower curve is obtained from the upper curve by dividing the various points of the latter by the number of positions covered by an "A" operator.



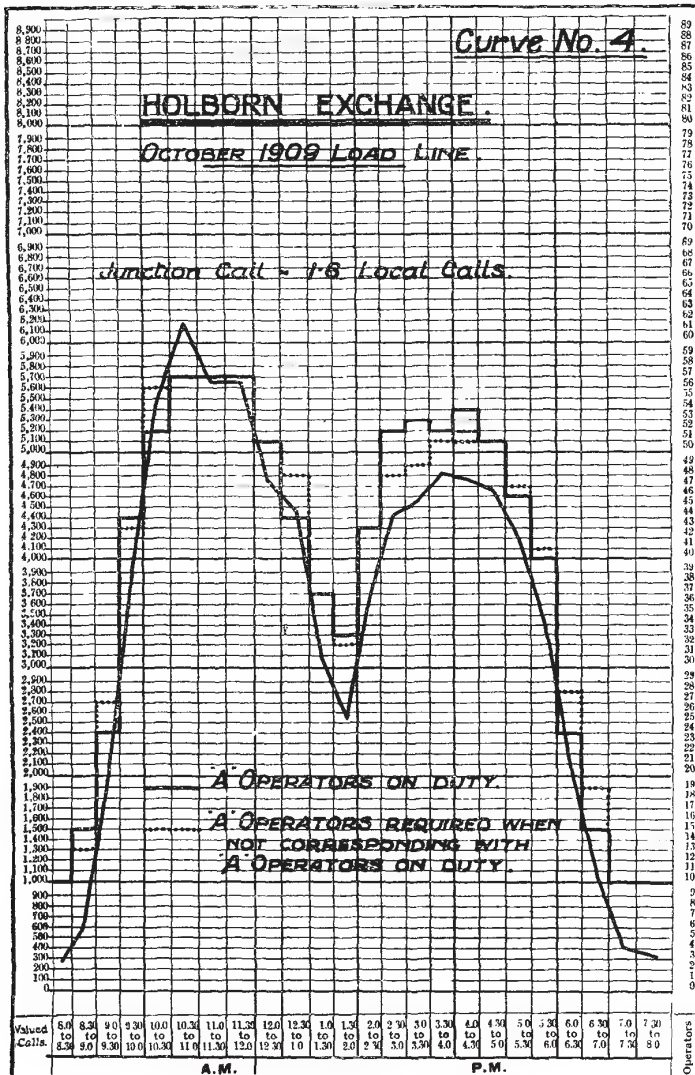
It therefore represents the valued calls per position. I have given an example showing exactly how the number of "A" operators required is obtained in a particular half-hour and for a given traffic at an exchange with a particular number of "A" positions.

A simple method, devised by Mr. Jenkins, the Bank Exchange Manager, for ascertaining at a glance whether the correct staff is on duty during each half-hour of the day, is to show on a load line curve not only the staff on duty, but also the staff required as ascertained by the method already explained. Curve No. 4 is the October, 1909, load line for Holborn Exchange. The junction valuation at this exchange is taken as 1.6. It will at once be seen how easy it is to discover by this method if the correct staff is in attendance during each half-hour of the day. It will also be noticed that there is no visible connection between the load line curve and the number of "A" operators required. For instance, who could tell, without calculation, that 51 "A" operators were required between 4 p.m. and 4.30 p.m. at Holborn? I should like to impress this point upon those who may have to criticise the load line curve for any exchange.

The method I have described may be considered laborious, but the result, I think, justifies the trouble expended. If an exchange is not so rapidly growing that additional "A" positions are frequently being brought into use it is quite easy for any exchange manager to draw a curve for an exchange of definite size, by means of which he can ascertain at a glance the number of "A" operators required for any given traffic, the efficiency of the operator being taken into consideration. Curve No. 5 is such a curve for an exchange of ten working "A" positions. The example given is sufficient to explain how the curve is derived. Directly the exchange exceeds ten positions a fresh curve must be plotted.

These considerations apply equally to the number of "B" operators required during each half-hour of the day, except that the average load which a "B" operator should take when she is working at her maximum efficiency varies for each exchange, being dependent upon the various classes of "B" positions existing. There is not, therefore, that simple connection between the operator's efficiency and the corresponding load that exists in the case of originating traffic, and this fact complicates calculations to some extent.

I should like now to draw attention to this point. The number of operators which the traffic shows is required during each half-hour throughout the day should be, in Post Office language, the "Nirvana" (!) of the exchange manager, although possibly he may never attain it in the case of large exchanges. At such exchanges it is as impossible to predict the exact shape of the load line as it is to predict that a particular staff will be on duty. I think





everyone will admit in the case of a large exchange that if it were found that the operators on duty on a particular day exactly corresponded with the operators required, half-hour by half-hour, it would indeed be an extraordinary coincidence. It is of interest to know that curve No. 4 demonstrates an arrangement of duties which is efficient to the extent of 96.2 per cent. I have obtained this figure by considering, for example, that it is just as inefficient to have two operators more than required in a particular half-hour as it is to have two operators less. At Holborn, therefore, the arrangement of duties is highly efficient, and it would probably have been more efficient if the sanctioned staff had been exactly what was necessary.

(To be concluded.)

## TELEPHONE DEVELOPMENT IN THE EARLY EIGHTIES.

By W. H. GUNSTON.

OLD records have a historical, if not a practical interest, and something more than an idle curiosity is aroused by a reference to the Company's earliest Press-cutting book, which covers a period extending from 1882 to 1885. The strangulating restrictions which the Post Office had placed on the development of the telephone were about this time (1884) to some extent removed by the granting of licenses whose scope was not confined to prescribed limited areas, and whilst some of the newspapers are loud in their praises of what they consider Mr. Fawcett's statesmanlike settlement of the problem, others deplore the creation of a private monopoly. It is strange to read as far back as 1882, when there were only about 5,000 telephones in the whole of England, allusions to the United Telephone Company as a huge monopoly! Many of the cuttings refer to infringements of patents and to the dispute between the United and the Globe Telephone Companies, which was ended by the acquisition of the latter by the former in 1884.

The *Pall Mall Gazette* of Dec. 6, 1883, contains a lively and instructive description of an exchange in those days:

"What, then, is a telephone exchange station? We will take the East India Avenue, in the City, as an average sample. From the lofty roof of one of the houses of that sombre court rises a derrick, a square structure of wrought-iron bars 30 or 40 feet high by 8 or 10 feet wide, and looking like the upper portion of a skeleton lighthouse, very rigid and very transparent. This edifice is surmounted by a lightning conductor; you ascend it by a perpendicular ladder, and, pausing on its upper story—for it is divided into two floors—you look round from your airy perch to find that what appear innumerable wires radiate from your transparent cage in every possible direction over the dirty housetops of the City. Most of these wires are bare and unenclosed; others are in cables containing each twenty wires. Each of them is lettered and numbered, and a cupboard on the derrick contains an apparatus for testing them. So much for what is above the roof. Below, in the attic, is a room occupied by eleven young ladies. The 271 wires, which represent the subscribers of the East India Avenue Exchange with 46 trunk and other direct wires, are guided down from the derrick above into neat mahogany cabinets or cases, in front of which the young ladies are seated. The alert dexterity with which at the signal given by the fall of a small lid about the size of a teaspoon the lady hitches on the applicant to the number with which he desires to talk is pleasant to watch. On the day of our visit there had been in this one office no less than 2,400 calls. Here, indeed, is an occupation to which no "heavy father" could object; and the result is that a higher class of young women can be obtained for the secluded career of a telephonist as compared with that which follows the more barmaid-like occupation of a telegraph clerk."

One is at a loss to understand why the telegraph clerk's occupation is classed as barmaid-like.

Time has brought about some remarkable changes in the relative telephone development of different parts of the world, although, of course, America has always maintained the leading place. According

to the *Globe* of Nov. 23, 1882, the number of subscribers in the principal countries then was:

United States ...	...	...	37,187
England ...	...	...	5,000
France ...	...	...	3,600
Italy ...	...	...	2,902
Germany ...	...	...	2,322

Sweden is not mentioned. The figures probably refer to the end of 1881. *The Times* remarks "It is in America, of course, where the telephone is freer than on this side that the development is greatest." Thus early were the cause and effect of Europe's backwardness demonstrable.

The *Pall Mall Gazette* in March, 1883, gives the total number of telephone lines in the world, presumably at the end of 1882, as 78,008, of which 41,569 were in the United States, 7,287 in Great Britain, 5,507 in Italy, 4,437 in France, and 3,613 in Germany. The high position of Italy is noticeable; they are second amongst European States in 1880, in 1809 they drop to fifth place, and at the present time they are as low as ninth. When we come to individual towns we find Paris in front of London, and Vienna in front of Berlin. *The Times* gives the following figures of subscribers' lines for October, 1882:—

New York ...	...	...	4,060
Chicago ...	...	...	2,726
Paris ...	...	...	2,422
London ...	...	...	1,600
Amsterdam ...	...	...	700
Stockholm ...	...	...	672
Vienna ...	...	...	600
Berlin ...	...	...	581

Cincinnati comes above London, and Boston and San Francisco above Amsterdam. The development of the United Telephone Company's system in London in the early eighties was as follows:—

Dec. 31, 1880 ...	89 subscribers.
" " 1881 ...	1,338 "
" " 1882 ...	2,386 "
" " 1883 ...	3,195 "

The National Telephone Company which then operated in most of the towns in Great Britain outside of London and Lancashire possessed the following subscribers at the end of 1882 and 1883:—

	1882.	1883.
Total system ...	2,350	3,487
Glasgow ...	694	742
Edinburgh ...	231	283
Bradford ...	223	283
Leeds ...	159	286

Great Britain maintained its position at the head of Europe until somewhere in the late eighties, when Germany got in front, and has remained there ever since. Its population, of course, is half as large again as that of this country.

In conclusion I give a table showing the vicissitudes in telephone development of seven of the great cities of the world at various intervals from 1882 to the present time. What is most remarkable is the way in which Berlin passes from last position in 1882 to first in 1888, far exceeding the development of New York, a position which it maintained until 1899. New York has now outdistanced all its rivals, and London is well ahead of Berlin.

	1882. Lines.	1888. Lines.	1898. Stations.	1904. Stations.	1909. Stations.
New York	4,060	6,902	29,283	148,667	361,302
Chicago...	2,726	4,694	...	78,703	207,719
Paris ...	2,422	5,300	19,351 (lines)	46,933	69,205
London...	1,600	6,978	20,561 (lines)	93,598	181,011
Stockholm	672	5,800	25,000 (approx.)	40,476	61,588
Vienna ...	600	1,600	10,573 (1897)	20,000 (approx.)	41,552
Berlin ...	581	9,199 (stations)	36,650 (1897)	66,449	112,225

## TELEPHONE WOMEN.

## LXX.—FLORENCE KENNERLEY.

MISS KENNERLEY has completed seventeen years in the Company's service in Llandudno, having taken up duty on Sept. 19, 1892, as one of the two operators engaged when the exchange was first opened with 25 subscribers. The exchange premises were the two top rooms of an otherwise empty building in



FLORENCE KENNERLEY.

Sloddaeth Street (now part of the Clarence Hotel). The service given at the opening of the exchange was from 9 a.m. to 6 p.m., which was later extended to 8 a.m. to 8 p.m. When the building in which the exchange was situated was connected to the Clarence Hotel, arrangements were made with the manager of the hotel to give an all-night service, and Miss Kennerley remembers well on entering the switchroom one morning finding nearly all the subscribers' indicators plugged up with matches, and on asking for an explanation receiving the reply "Oh, those subscribers worry me too much." Needless to say complaints were numerous at this time. In April, 1894, the exchange was removed to the present building in Mostyn Street, where Miss Kennerley, with necessary assistants, now has charge of more than 300 subscribers' lines.

Miss Kennerley has served under two provincial superintendents, four district managers and four local managers, and such are her capabilities and unfailing courtesy that it is not too much to say she has pleased them all. She is of a retiring and unassuming disposition, and is very popular with all her colleagues on the staff.

## LXXI.—ELIZA MILLER.

MISS MILLER entered the Company's service in March, 1891, and took up duty in the South Side Exchange (now named the South Exchange), Glasgow. At that time the South Side Exchange was the only exchange in the Glasgow district situate on the south side of the River Clyde. To-day there are thirteen exchanges, four of which serve the districts originally served by the South Side Exchange.

The staff of the exchange in March, 1891, consisted of three operators and the system was magneto, the subscribers and junction

(incoming and outgoing) lines terminating on single cords in addition to jacks. The subscriber after signalling the exchange waited until the operator rang back before taking the receiver from the hook. The operator answered by saying "Well," and the subscriber after giving his call replaced the receiver on the hook and had to be called again by the operator when the attention of the number asked for had been secured. The only junction lines in existence were from and to the Royal Exchange over which all calls from and to other exchanges had to be effected.

The operator's equipment like the subscriber's equipment was somewhat primitive and the method of operation was in keeping with the equipment. To detail the many operations necessary in dealing with a connection, although interesting, would be too lengthy a process. Suffice it to say that the operators then, as always, carried out their duties in as efficient a manner as the equipment permitted. Co-operation between operators was not even then a latent virtue, it being quite customary for the operators to assist each other.

A few years later the call-wire system was introduced, but as this phase has been dwelt on in previous biographies of "Glasgow Telephone Women" it need not be gone into here.

In November, 1899, a new exchange on the "ring-through, lamp call and clear (relay call key)" system, the first of its kind in the Glasgow district, was opened in Govan to which exchange a considerable number of the subscribers connected to the South Side Exchange was transferred, and Miss Miller was appointed to take charge of it. The science of telephone traffic and large transfers of subscribers from one exchange to another had not then been so thoroughly mastered, and things did not go quite so smoothly as they do to-day. Unfortunately also, the fates were unkind, and within a few days of the opening the main underground dry-core cable, the first underground cable to be laid down in the district, broke down, and for two or three days only local calls between subscribers whose lines had been unaffected by the break-down could be effected.



ELIZA MILLER.

The defect was put right as speedily as possible, and shortly thereafter subscribers and staff alike becoming thoroughly conversant with the new method of working, a marked improvement in the service compared to that possible under the call-wire conditions was speedily effected, co-operation between the operators, not then but now known as "team work," assisting largely in bringing about this desirable result.

In June, 1905, Miss Miller was appointed Clerk-in-Charge of the South Exchange, which between the date of her leaving it and



her return to it had been wiped out by fire and rebuilt. The "call-wire" system had given place to the "lamp" system, and the switchboard was a keyless one. This type of switchboard, however, did not prove an unmixed blessing, and later, to overcome operating troubles incidental to its design, keys were fitted.

In July, 1909, Miss Miller saw another transfer of subscribers from South Side Exchange to a new exchange then opened in Pollokshields, and that part of the work devolving on her staff was very efficiently performed.

In February, 1908, Miss Miller was appointed to her present post, and as the female staff of the exchange numbers 125, it will be realised that her position is no sinecure. Her duties are many and important, and these she carries out in a most satisfactory manner. Throughout her length of service with the Company she has most ably filled the various positions of responsibility she has occupied.

Miss Miller takes a practical interest in the enjoyment and welfare of the staff over which she has control; she takes an active part in the management of the Operators' Society and Club, acting as sub-convenor of the syllabus sub-committee, and is treasurer of her exchange branch of the Savings Bank Society.

In her leisure time she finds pleasure in music and painting.

### HIC ET UBIQUE.

It is interesting to learn on the authority of a telephonic contemporary quoting from another American paper, the *Monthly Bulletin*, that Oklahoma is still "wild and woolly." It publishes the photograph of two "A" operators and remarks:

These girls live on "nearby ranches and large farms. They are accustomed to outdoor sports of all kinds, they ride horses with a skill that would shame some cowboys, they shoot with a true eye," and they indulge in athletic stunts that would make a college football player resemble a mollycoddle.



It appears that most of the subscribers are Indians who cannot be taught to call by number. (We have the same trouble in some of our supposedly civilised exchanges!) When an Indian who hasn't a telephone is wanted, the operator shuts up shop, buckles on her trusty '44, jumps on her broncho and scours the plains to find the Indian and save the call. It keeps her pretty busy answering calls and finding Indians. You will notice that one of the operators has a lariat ready; if an Indian get obstinate about journeying fifteen or twenty miles back to central to listen to a lot of piffle from a fellow tribesman, why the operator probably just lassoes him and gallops back with him on the end of the rope. We wish we could use that method to get some people to answer the telephone in our exchanges.

We accept no responsibility for the veracity of our contemporary's contemporary, and merely observe for the enlightenment of our readers that the nearest equivalent of "stunt" in a civilised anguage that we can call to mind is "*tour de force*."

OUR Norwich correspondent informs us of a subscriber who failed to induce the incoming tenant of his residence to retain the telephone. The new tenant hailed from a country rectory and objected to "gas, telephone and all such things." Our correspondent remarks that the attitude is somewhat representative of the non-progressiveness of many of those who theoretically profess to "walk in the light."

THE fact that the circulation of the JOURNAL has recently extended to New Guinea, and Entebbe, Uganda, has moved a poetical correspondent to contribute the following verses:—

From Arctic to Antarctic  
Through every varying zone  
Wherever wends an engineer  
The JOURNAL holds it own.  
From where the rolling Andes  
Hold the secret of Manoa  
To where the Portugals still cling  
To the Indian port of Goa.  
Where the "golden sands" of Afric  
Blaze in the gorgeous noon  
And where old Nile takes its rise  
In the Mountains of the Moon.  
Through European cities  
Its conquering course has run  
Through the Golden Gate of Peking  
To the Land of Rising Sun.—(E. M. B.)

We do not vouch for Goa, and attribute the Mountains of the Moon to poetical licence, but otherwise the literal sense of the verses is absolutely correct.

### GLASGOW NOTES.

*Bell Golf Club.*—The monthly medal competition for May was held at Carnytne on May 21. Ideal weather prevailed, and Mr. R. F. Gilchrist was returned the winner. The summer hole-and-hole tournament is now proceeding, several of the second round ties having been played off. Arrangements have been completed for the East v. West match, which will be played over Hamilton Palace course on July 2. There are fourteen players a side, Glasgow, Greenock and Kilmarnock being represented on the West side, and Edinburgh, Galashiels and Kirkcaldy on the East. Play will take place by singles in the afternoon, after which tea will be served and foursomes engaged in.

*Evening Cruise.*—An evening cruise took place on Tuesday, June 21, when a company of the staff, numbering about 200, journeyed by special train to Balloch, and thereafter had a most enjoyable cruise on Loch Lomond.

FROM time to time we have recorded changes in view of the approaching transfer of the Company's business to the Post Office, Post Office subscribers being connected to the National Exchanges and *vice versa*. Hitherto only comparatively small exchanges have been dealt with, but during this month (July) the Post Office undertake a more formidable task in the transfer of subscribers to the new Central Exchange in Waterloo Street. The Post Office subscribers will be joined up on the new exchange on July 15, and it is suggested that the transfer of the Company's subscribers from Royal may take place about Aug. 27.

THE results obtained by those members of the staff who attended the technical college during the past winter and presented themselves for examination have now been published, and on the whole these are very satisfactory. Forty-eight first-class and 63 second-class merit certificates, as well as several prizes, were secured, and we hope to give details of the more outstanding individual successes in next issue.

### POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

The following paper, read before the above institution, is now on sale at the price mentioned:—

"Depreciation," Major O'Meara, C.M.G. . . . . 1s.

Application for copies should be made with remittance to the Engineer-in-Chief, Head Office.

### A NOVEL USE FOR THE "JOURNAL."

WHAT is, we think, a rather novel use for the NATIONAL TELEPHONE JOURNAL has just come to light. While cycling about six miles from Dublin, on Sunday, June 12, a young lady was knocked down by a horse and trap, sustaining a fracture of both bones of the left leg above the ankle. A member of the Company's staff living near by was appealed to and promptly set the broken bones, making an excellent inner support for the injured limb by rolling a few NATIONAL TELEPHONE JOURNALS round it and then fitting a temporary splint.

So well did the JOURNALS perform the duty imposed on them, that on reaching the hospital the doctors made very flattering remarks about the manner in which the "setting" was carried out.

This is the third person treated in this hospital within three weeks who has had "first aid" rendered to them from the same member of the Company's staff.



# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

Published Monthly at  
TELEPHONE HOUSE, VICTORIA EMBANKMENT, LONDON, E.C.

## NOTICES.

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Vol. V.]

JULY, 1910.

[No. 52.]

## GOVERNMENT DEPARTMENTS AND COMMERCIALISATION.

In an article in *The Times* of May 6, entitled "The Lesson of the Telegraphs," the writer, after some severe strictures on the conduct of the national telegraph service by the Government in the past, institutes an unfavourable comparison between the cost of working the telephone systems of the Post Office and The National Telephone Company, and gives figures showing that the capital cost and working expenses per station of the former are considerably higher than those of the latter, whilst the Department's nett revenue per station is appreciably lower than that of the Company. In conclusion he says: "These figures indicate clearly that the approaching transfer of the telephone business from commercial to Government management ought, in the interests of economy as well as efficiency, to be made in the reverse direction." That the comparison of the moderate-sized system of the Post Office with the extensive one of the Company may prove fallacious, and that the future prospects of the service are more reassuring than the above-mentioned criticism would indicate will be the hope of the optimist. But it becomes outstandingly clear, the more the question is considered, that some far-reaching alterations and re-arrangements of the governmental machine will be necessary when it tackles the heavy work—the much under-estimated and uncomprehended work, as we believe—of running the national telephone service.

It is a singular coincidence that at this juncture a report is to hand made by M. COUYBA, reporter to the Finance Committee of the French Senate, on the Postal and Telegraph Budget for 1910. We have made several references recently to the condition of telephonic affairs in France, chiefly in respect to the effects of the governmental policy on development, for otherwise the state of the service in the two countries affords little scope for comparison. What interest us in the present report, however, are the paragraphs headed "Is it necessary to 'commercialise' the Post Office Department?" in which M. COUYBA (whose report throughout shows a masterly grip of the subject) refers to the administration as not being sufficiently in touch with its customers, as not

paying sufficient attention to the requirements of the public, and as putting itself in the unpractical situation of an industry which seeks to make profits, but which fears to increase the number of its customers. "Sometimes," he says, "it seems as if all possible efforts had been made to prevent a too rapid development of the traffic"; and he complains of lack of methodical study of public requirements, and neglect to extend the administration's field of action and to carry efficient reforms into effect. "It is absolutely necessary," he concludes, "that the great postal telephone and telegraphic industry should renounce the habits and methods of the past, and should become 'commercialised' as soon as possible. Such a change is essential to efficient service and the progress which is desirable."

The flinging of a vast national system entailing the maintenance and rapid extension of the service of over 500,000 subscribers to the care of any Government Department would tax its administrative resources to the utmost, and more especially a service so complex, so technical, so specialised, and so "commercial" (in its best sense) as that of the telephone. That an enterprise so commercial must needs be handled with the maximum of commercial expedition is self-evident, both in order that its efficiency to the public may not be diminished and that its value as a financial asset to the nation may not be destroyed. Will the Department still endeavour, if we may employ a metaphor, to haul this huge accretion to its train with one engine, or will the train be run in two sections? We think necessity will point to the wisdom of the latter choice.

The National Telephone Company has by slow and steady steps built up a great system. A specially qualified staff has been built up with it. Experience, training and diverse qualifications have fitted the latter to the former, with the result that a homogeneous whole has been created. This specialised staff, familiar with all the exigencies of the service, is working harmoniously in an established order, based on much experiment and long, well-tried experience. Should it become necessary to form a telephone separate department, as we believe it will, would it not be worth considering the possibility of retaining an organisation which is the mature result of slow and scientific development (merely making such slight alterations as may be necessary for governmental control) and obtaining for the State the advantages of the commercial efficiency with which it has worked, tempered by the experience in government work of the existing telephone employees of the Post Office.

## PROMOTION.

THE hope of promotion is common to the average man. The worthiest desire to attain it by merit; to many it is welcome from whatever source it comes; and a not inconsiderable number even prefer promotion by favour, for to certain souls the favour of the great is more precious than the consciousness of ability. The problem of promotion by merit is naturally the only one worthy of serious consideration, and it is hedged about with formidable difficulties. Worth is not always apparent, latent abilities are not always discernible, and character is often difficult to read. A man may find another with more showy and meretricious abilities preferred before him—not owing necessarily to defective judgment on the part of his chief, for the force of circumstance may have presented the inferior man in the more favourable light. True ability, no

doubt, tells in the end, but the thorny problem is to advance it to its due reward at all times.

The thoughtful article on this subject by our contributor will have a widespread interest for our readers. His suggested principles of selection have much to commend them, amounting as they do to the combined appreciation of a man's knowledge, character, and usefulness by both his chief and seniors. Whilst a great chief is generally a good judge of men and can divine almost intuitively the stuff a man is made of, there are many in whom this gift is not conspicuous, and the judgment of one man is at best a slender thread on which to hang a man's fate. We refer chiefly to the judgment of latent powers; but even the judgment of actual work and knowledge may be strengthened by the verdicts of second and third judges. Our contributor speaks truly when he says that examinations are no test of a man's knowledge, and we have before expressed our opinion of that kind of rivalry which promotes jealousy and disinclination to impart one's own knowledge to another or to assist him in difficulties. Whatever unfortunate effect such a spirit may have on the individual character, it has a ten times worse effect on the cumulative usefulness of a body of men serving any administration.

### THE BRITISH ANTARCTIC EXPEDITION.

WHAT we believe to be the first attempt to use the telephone in connection with Polar discovery will be that made by Capt. ROBERT SCOTT in the expedition which has just set sail to make a further endeavour to reach the South Pole. We congratulate the staff on their gift to the exploration party of a telephonic outfit, which will doubtless facilitate communication between point and point on those desolate shores, and, it is hoped, afford some additional security to human life in this hazardous expedition. The proposed telephone system consists of lines from the winter quarter's hut to the observatory hut (about a quarter of a mile away), from a post in the open air near the observatory hut to another post in the open air about five miles away, and from the winter quarter's hut to Sir ERNEST SHACKLETON'S old quarters, 26 miles distant. The wires will be laid direct on the snow, a few feet apart; the low temperatures which are to be expected in these regions will, it has been calculated, improve the conductivity of the wire by some 30 per cent. The storage batteries belonging to the expedition will be employed to supply the current, as primary cells cannot be expected to work in polar latitudes.

Whether Captain SCOTT'S adventurous party are successful in their quest or not—and it will be the fervent wish of every telephone man that they may be—it seems tolerably certain that the news of the measure of success that has crowned the advanced party's efforts will reach the winter quarters over these lines and instruments, and the National staff, having presented the equipment, will have a personal and peculiar interest in the "Furthest South" telephone.

### NOTICES.

Portraits of Messrs. B. Waite, F. Cowley, E. J. Hidden, A. Martin and R. Gilmour on sunk art-plates, price 6d. each, are now ready. Those of Messrs. C. E. Fenton and J. D. W. Stewart are on order.

Binding cases for Volume IV are now ready, price 1s. 7d. each.

Back numbers of any year of the JOURNAL (except April, 1906) can be obtained, price 3d.; 4½d. post free.

Next month's issue will contain a full report of the speeches at the Annual Staff Dinner. Several interesting articles have been held over owing to pressure of space.

### TENSION AND SAG IN OPEN WIRES.

By J. F. COOTE, A.M.I.E.E., *Engineer-in-Chief's Department.*

(Concluded from page 55.)

The curves obtained by plotting the values for the tension and sag given in the table are shown in Fig. 2, and on comparison with those given in Fig. 1 they will be found strikingly different. The tension curve is now practically a straight line, with none of the sudden rise near the minimum temperature. The variation over the whole range of temperature from 20° to 100° amounts to only 53 lbs. when elasticity is considered, as against 89 lbs. when it is ignored. The sag curve (see Fig. 2) is now convex to the temperature axis, with a more rapid variation at high temperatures, whereas that of Fig. 1 is concave with a more rapid variation at the low temperatures. The total variation between the same temperature limits as before is only 0.46 feet when elasticity is taken into account, as compared with 2.1 feet when it is neglected. The general effect of elasticity is to considerably increase the tension and diminish the sag at any given temperature.

This may be illustrated by the figures given in Table 3 for wires erected to a factor of safety 3 at 20° F.

TABLE 3.

Wire.	Span. Feet.	Temp. F.	Tension in pounds.		Sag in feet.	
			Elasticity neglected.	Elasticity allowed for.	Elasticity neglected.	Elasticity allowed for.
100-lb. copper	150	30	52	103	1.02	0.52
"	"	90	22	62.5	2.42	0.85
"	300	30	81	104	2.64	2.05
"	"	90	43	71	5.12	3.00
40-lb. bronze	150	30	22.5	63.0	0.96	0.34
"	"	90	9	44.8	2.40	0.47
"	300	30	38.5	63.0	2.21	1.35
"	"	90	17.3	46.0	4.92	1.86

We will now examine the results of the experiments made on wires specially erected for the purpose of testing the theoretical calculations. They were made on 40-lb. bronze and 100-lb. copper wires in both long and short spans and at different factors of safety, and though only a few typical results can be given here, it will be seen that they demonstrate the serious inaccuracies which result

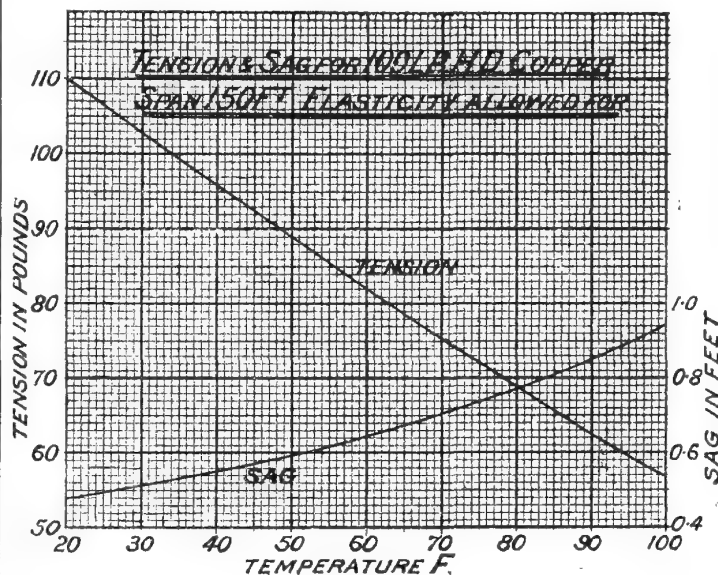


FIG. 2.

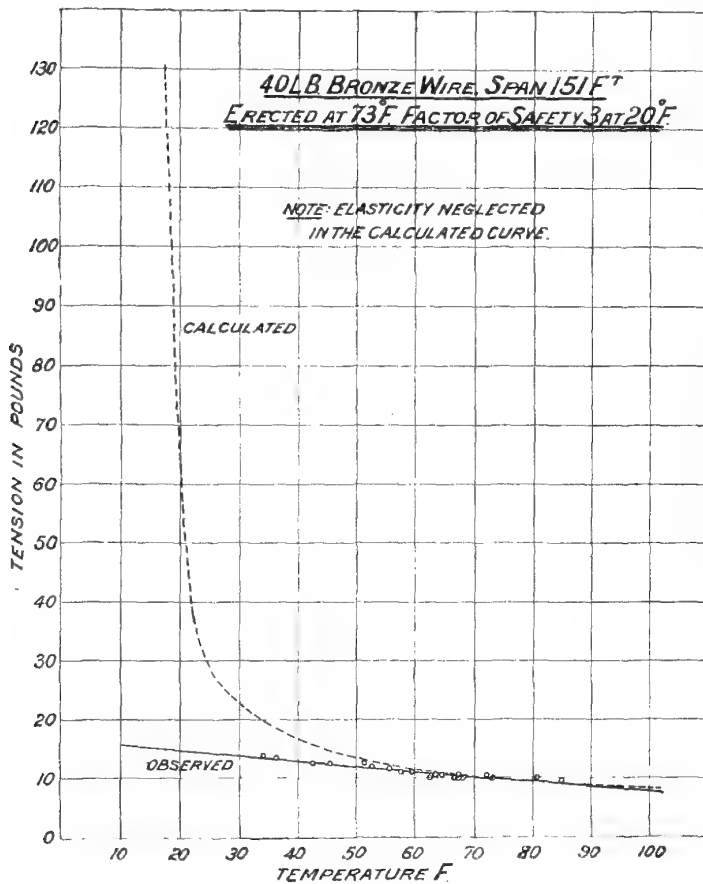


FIG. 3.

from a neglect of elasticity, and entirely confirm the calculations in which this factor is allowed for.

Fig. 3 shows the case of a 40-lb. bronze wire erected at 73° F. The observations were continued down to 34° F., the lowest temperature which was reached during the experiments, and the measured values of the tension all lie on a straight line, as they should do if the calculations based on elasticity are correct. This curve, if continued back, shows that the tension at 26° would be about 15 lbs. instead of 66 as the old tables stated. A still more striking fact is brought out by considering what happens when the temperature falls another 10°. The experimental curve shows that the tension only increases to 15.5 lbs.—a negligible amount—whereas according to the old tables the wire would break. This curve also brings out clearly another interesting point. In the case of wires erected in winter to the old tables, as the tension in reality follows a straight line curve it did not fall in summer to anything like the extent supposed, and the sag remained small so that the results, though far from what was expected, gave rise to no trouble; but, on the other hand, when wires were erected in summer with a large sag it was in the expectation that there would be a great increase of tension and corresponding diminution in sag when the temperature fell, but the present curve shows that nothing of the kind takes place, and on the occurrence of high winds, which are generally prevalent at lower temperatures, as the wires would still have a large sag, they would give continual trouble by swinging into contact, and this is what was actually found to happen in practice.

Fig. 4 shows the sags observed in the case of a 100-lb. copper wire erected at 68.5° F. and also those calculated on the old method. Here, again, the experimental values show that method to be entirely wrong. An interesting point may be noticed in the experimental curve. The dotted lines show the first four values in the order in which they were observed, and it will be seen that the wire during the interval, which was six days, acquired a

small increase of sag, probably due either to the straightening out of sinuosities in the wire or a slight permanent set under the load, after which it appeared to settle down. This was found to occur in all cases, and was greater in proportion to the tension at which the wire was erected.

In connection with this curve it may be pointed out that in Technical Instructions XIII issued by the Post Office, tables calculated on the old method are still inserted; a note, however, is added which states that "elasticity has been designedly neglected in these tables; the result of the omission is that new lines erected in summer will at low winter temperatures have somewhat greater sags than the tables indicate." The extent of the "somewhat" may be judged by the case here considered.

Fig. 5 shows a 100-lb. copper wire erected at 68.5° in a span of 151 feet and another at 69° in a span of 256 feet, together with the calculated sags when elasticity is taken into account. It will be seen that the observed curve follows the calculated one very well, though the sags are a little greater owing to the lengthening of the wire after erection as mentioned above.

It will, therefore, be seen that in all these cases the calculated values in which elasticity has been allowed for give results which are in accordance with what actually does take place in open wires

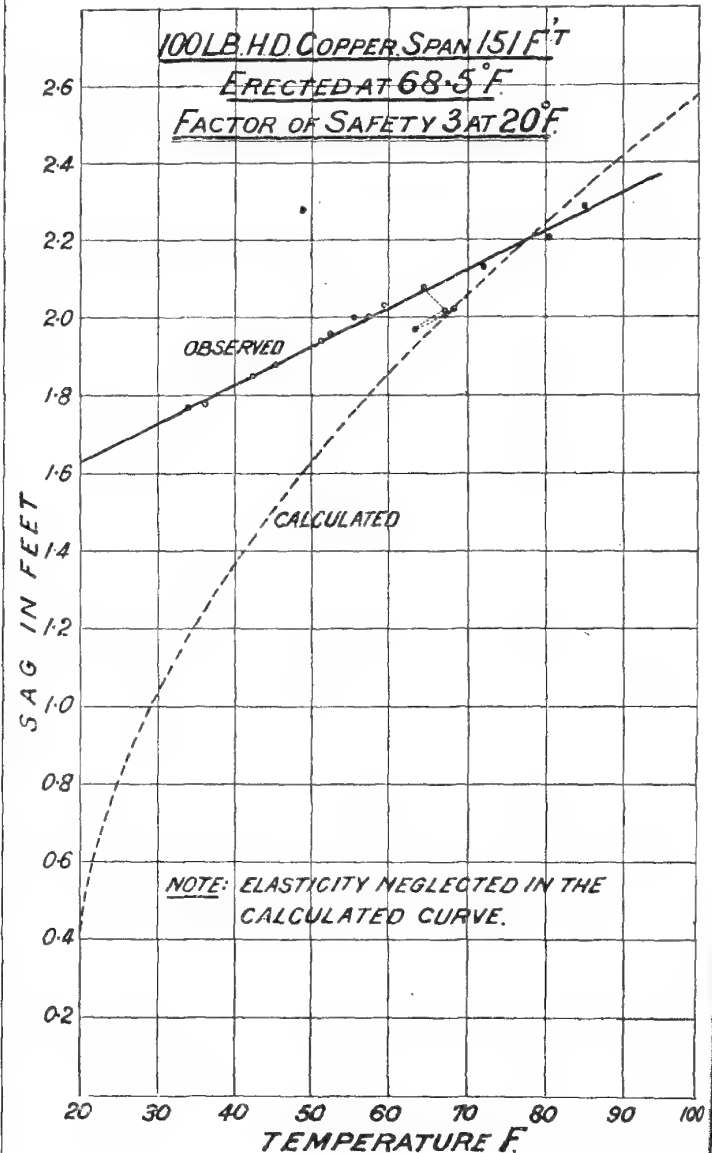


FIG. 4.



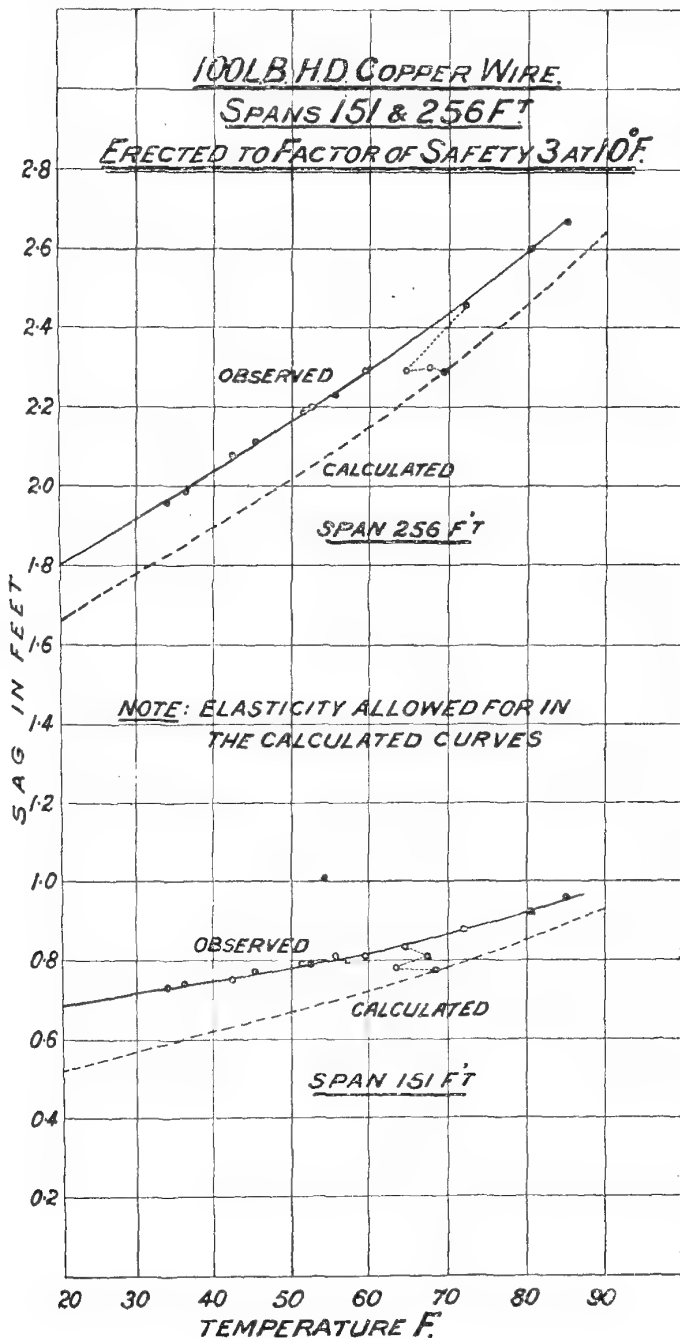


FIG. 5.

under variation of temperature, whilst if elasticity is ignored the results are very erroneous.

The great value of the effect of elasticity from a practical point of view is that it tends to keep the tension and sag much the same as when erected, whether this be done at high or low temperatures, and prevents those excessive changes which would occur if temperature alone came into play, and which at very low temperatures would cause the rupture of the wire.

Having ascertained that the new calculations could be relied upon to give true results the writer proceeded to work out complete tables for several factors of safety. Two of these are embodied in Fig. 6, which shows the tension and sags curves of 100-lb. copper and 40-lb. bronze wire for spans of 150 to 300 feet, calculated for a factor of safety of 3.0 at 10° F. In the old tables 20° F. had been taken as the minimum temperature, but in working out new ones it

was decided to alter this to 10° F. It will be seen that in the case of 40-lb. bronze wire there is scarcely any difference in tension for spans of 150 and 300 feet, while in the case of 100-lb. copper it only amounts to 10 lbs. at 90°. These curves at once showed that a mean tension curve for all spans over the given range might be adopted without any error of importance in practical work. This is a great advantage because a wireman no longer needs to know the length of span in which he is erecting wires, and thus one factor (which is dependent upon him) for accurate work is eliminated. The tensions for a span of 225 feet, may be taken as mean tensions, and Tables 4 and 5, which show the tensions and sags of copper and bronze wires for a factor of safety, 2.5 at 10° F., are based upon such mean curves. This factor of safety may be taken as representing very closely the common practice of the Company in open

TABLE 5.  
Tension and Sag for Bronze Wire.  
(Factor of safety 2.5 at 10° F. Elasticity allowed for.)

Temp. F.	Stress lbs. per square inch.	Tension in lbs. for weight per mile of		Sag in feet for span of						
		40-lb.	70-lb.	150 feet.	180 feet.	210 feet.	240 feet.	270 feet.	300 feet.	
10	40,740	80	140	0.26	0.38	0.52	0.68	0.87	1.07	
15	39,930	78.5	137	0.27	0.39	0.53	0.69	0.88	1.09	
20	39,130	77	134	0.28	0.40	0.54	0.71	0.90	1.11	
25	38,340	75	132	0.28	0.41	0.55	0.72	0.92	1.13	
30	37,550	73.5	129	0.29	0.42	0.56	0.74	0.94	1.15	
35	36,770	72	126	0.29	0.42	0.57	0.75	0.96	1.18	
40	35,980	70.5	124	0.30	0.43	0.59	0.77	0.98	1.21	
45	35,190	69	121	0.31	0.44	0.60	0.78	1.00	1.23	
50	34,410	67.5	118	0.32	0.45	0.62	0.80	1.02	1.26	
55	33,640	66	116	0.32	0.46	0.63	0.82	1.04	1.29	
60	32,870	64.5	113	0.33	0.47	0.64	0.84	1.06	1.32	
65	32,100	63	110	0.33	0.48	0.66	0.86	1.09	1.36	
70	31,330	61.5	108	0.34	0.50	0.67	0.88	1.12	1.38	
75	30,560	60	105	0.35	0.51	0.69	0.91	1.15	1.42	
80	29,800	58.5	102	0.36	0.52	0.71	0.93	1.18	1.46	
85	29,040	57	100	0.37	0.54	0.73	0.96	1.21	1.49	
90	28,290	55.5	97	0.38	0.55	0.75	0.98	1.24	1.53	
95	27,540	54	95	0.39	0.57	0.77	1.01	1.27	1.57	
100	26,800	52.5	92	0.40	0.58	0.79	1.03	1.31	1.61	

Modulus of elasticity,  $17.8 \times 10^6$  pounds per square inch.  
Co-efficient of linear expansion per 1° F.,  $8.87 \times 10^{-6}$ .

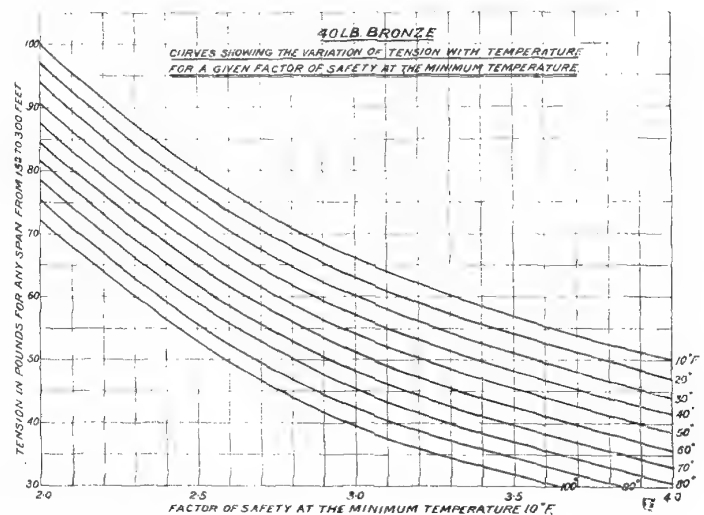


FIG. 7.

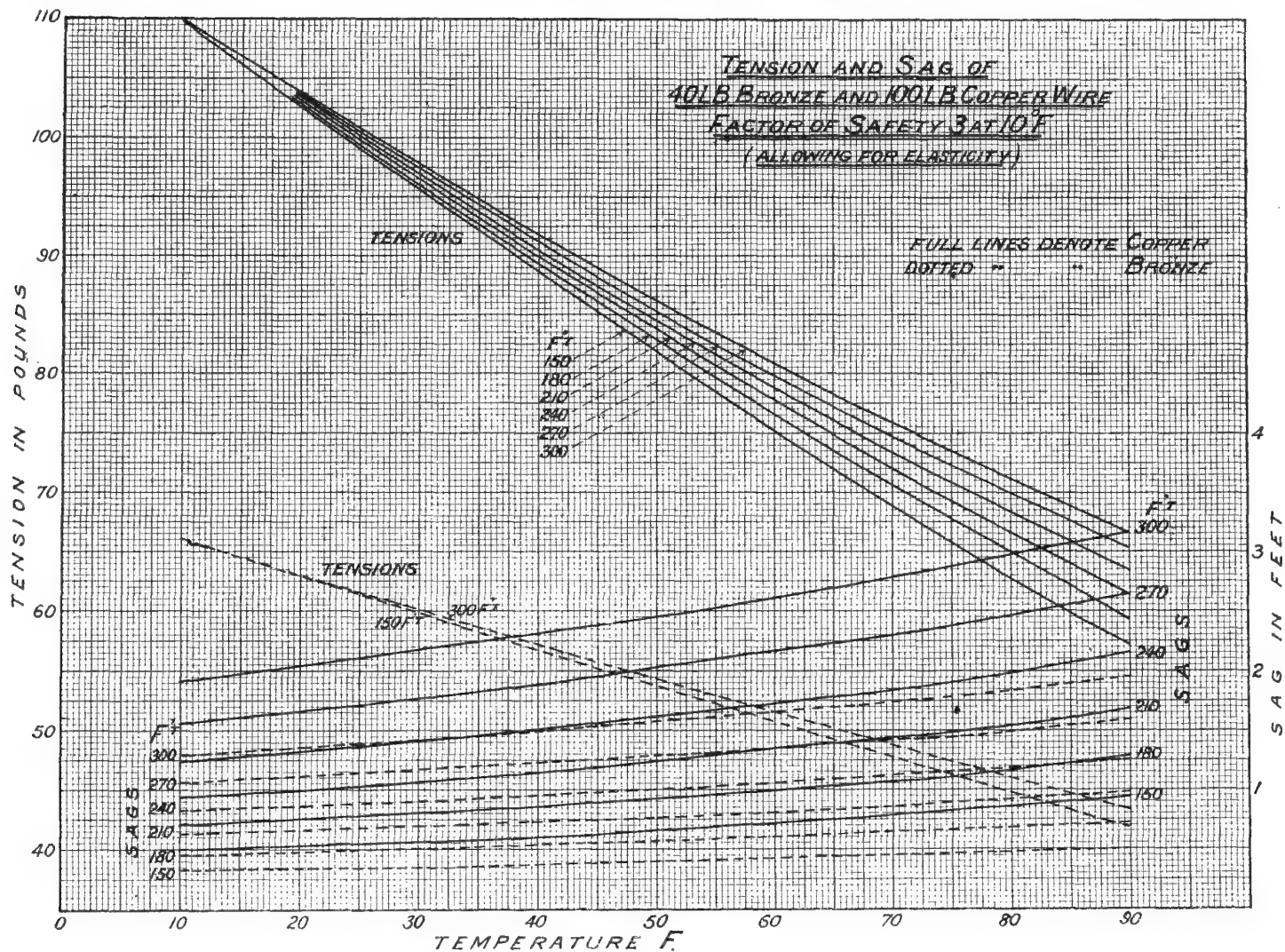


FIG. 6.

TABLE 4.  
Tension and Sag for hard-drawn Copper Wire. (Factor of safety 2.5 at 10° F. Elasticity allowed for.)

Temp. F.	Stress lbs. per square inch.	Tension in pounds for weight per mile of						Sag in feet for span of						
		100-lb.	150-lb.	200-lb.	300-lb.	400-lb.	600-lb.	800-lb.	150 feet.	180 feet.	210 feet.	240 feet.	270 feet.	300 feet.
10	26,900	132	198	264	396	528	792	1,056	0.40	0.58	0.79	1.03	1.31	1.61
15	26,170	128	193	257	385	514	771	1,028	0.42	0.60	0.82	1.06	1.34	1.66
20	25,450	125	188	250	375	500	750	1,000	0.43	0.61	0.84	1.09	1.38	1.71
25	24,730	122	182	243	365	486	729	972	0.44	0.63	0.86	1.12	1.42	1.75
30	24,040	118	177	236	355	473	709	945	0.45	0.65	0.88	1.15	1.46	1.80
35	23,380	115	172	229	344	459	688	918	0.46	0.67	0.91	1.19	1.50	1.86
40	22,700	111	167	223	334	445	668	891	0.48	0.69	0.94	1.23	1.55	1.92
45	22,030	108	162	216	324	432	648	864	0.49	0.71	0.97	1.26	1.60	1.98
50	21,350	105	157	209	314	419	628	838	0.50	0.73	1.00	1.30	1.64	2.03
55	20,690	102	152	203	304	406	609	812	0.52	0.75	1.03	1.34	1.70	2.09
60	20,030	98	147	196	295	393	589	786	0.54	0.78	1.07	1.39	1.76	2.17
65	19,370	95	142	190	285	380	570	760	0.56	0.80	1.10	1.44	1.82	2.25
70	18,700	91.5	138	184	275	367	551	734	0.58	0.83	1.14	1.49	1.88	2.33
75	18,070	88.5	133	177	266	355	532	709	0.60	0.86	1.18	1.54	1.95	2.41
80	17,440	85.5	129	171	257	342	513	684	0.62	0.89	1.22	1.60	2.02	2.49
85	16,800	82.5	124	165	247	330	494	659	0.65	0.93	1.27	1.66	2.09	2.58
90	16,160	79.5	119	158	238	317	475	634	0.67	0.97	1.32	1.72	2.17	2.68
95	15,570	76.5	115	152	229	305	458	610	0.70	1.00	1.37	1.78	2.26	2.79
100	14,990	73.5	111	147	221	294	442	588	0.72	1.04	1.42	1.85	2.35	2.90

Modulus of elasticity,  $17.8 \times 10^6$  pounds per square inch.Co-efficient of linear expansion per 1 F.,  $8.5 \times 10^{-6}$ .

wire construction, at the present time. For the sake of making the tables generally useful, other gauges of wire than those used by the Company have been included, and the values of the stress for different temperatures are also given. The tension for any weight of wire not given in the tables can easily be obtained, for, assuming the same stress at the minimum temperature, the stress at any other temperature is the same for all weights of wire, and therefore the tension is proportional to the sectional area of the wire, *i.e.*, to its weight. The sags given for the different spans apply, of course, to any weight of the wire in question. This is seen at once from formula (1), for if, in any given span, both the weight per mile and the tension be increased in the same proportion, the sag remains the same.

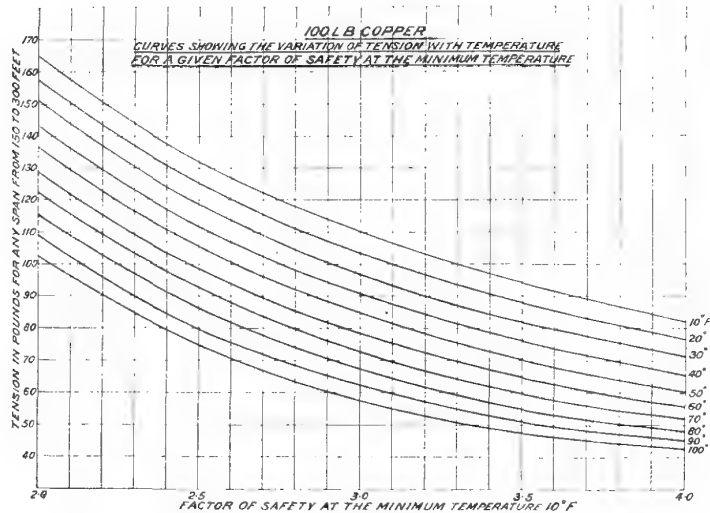


FIG. 8.

Figs. 7 and 8 show the relation between tension and temperature for 40-lb. bronze and 100-lb. hard-drawn copper wire for different factors of safety.

For further information upon this subject the following papers may be consulted:—

1. "Sag and Strain in Trolley Wires." B. Hopkinson. *The Electrician*. Jan. 25, 1901.
2. "Tension and Sag in Telephone and Telegraph Wires." C. E. Lawrence, *Telephone Magazine*, Chicago, September, 1901.
3. "Some Hints on Overhead Construction." O. Burne, *Journal of the Institution of Electrical Engineers*, April, 1901.
4. "The Construction of Overhead Electric Transmission Lines." A. P. Trotter, *Proc. Inst. Civil Engineers*. February, 1907.
5. "The Sag and Tension of Line Wire." C. T. Hutchinson, *Engineering News* (1899), Vol. 42, page 130.
6. "Conditions d'Équilibre d'un Fil de Bronze Phosphoreux Tendu Entre Deux Appuis." M. H. Cloeren, *Bulletin de la Société Belge d'Electriciens*, 1888.
7. "La Pose des Lignes en Bronze, Cuivre, et Aluminium." E. Pierard, *Proc. Soc. Belge d'Electriciens*, Feb. 23, 1904.

#### OLDHAM OUTING.

A PARTY of about 60 of the staff of the Oldham, Ashton and Stockport centres, with friends, had a very enjoyable outing at Rudyard Lake on June 4. The party travelled by special saloon, and reached the lake station about 3 p.m. Several of the members took advantage of the splendid boating facilities, while the more leisurely ones were content with the electric launches, which traverse the two-mile surface of the lake. A substantial dinner was provided at the "Hotel Rudyard," after which the party was photographed. Games and outdoor sports followed. The return journey was rendered very pleasant by an improvised saloon concert, in which Miss Partridge (Stockport) and Mr. Croasdale (Ashton) took active parts. The whole of the arrangements were undertaken by Mr. F. Cotchin, Contract Officer, to whom the thanks of the party are due for its complete success and their enjoyable time. They were, moreover, favoured by the weather, which was ideal.

## A FEW ECONOMIC PHASES OF THE MEASURED RATE.

BY GEORGE HEY, *Contract Manager, Oldham.*

(Concluded from page 54.)

#### NEW SUBSCRIBERS' CALLS.

But the valued calls made by a large batch of *new subscribers* was also ascertained, and in analysing the figures and comparing them with the "traffic" results for different periods after they were joined up it was found that there was a *certain relationship or ratio between the growth of such subscribers' traffic, or valued calls, and the publication of the subscribers' names in the Telephone Directory.*

The traffic upon these new subscribers' lines was abstracted for two definite periods. No special selection was made of the subscribers, these being taken in the same sequence as they appear in the books.

*First Period.*—For the first four months during which the 100 subscribers were connected up and *before* their names were published in any telephone directory.

*Second Period.*—During the first four months *after* their names had appeared in the Telephone Directory.

Seventy-five of the subscribers were renters under the business tariff A, and 25 under the residential tariff B.

*First Period.*—Increase of calls during second month upon first month was 49.7 per cent.

Increase of calls during third month upon first month was 59.4 per cent.

Increase of calls during fourth month upon first month was 62.5 per cent.

The average monthly increased growth of calls upon the first month's traffic during the first period was 57.2 per cent.

*Second Period.*—(After names appeared in directory.)

Increase of calls during first month, upon first month (as above), 86.7 per cent.

Increase of calls during second month, upon first month (as above), 58.8 per cent.

Increase of calls during third month, upon first month (as above), 84.5 per cent.

Increase of calls during fourth month, upon first month (as above), 103.6 per cent.

The average monthly increased growth of calls during the second period upon the traffic for the first month connected up was 83.4 per cent.

There is a marked and definite increased growth during the second period. The lapse in the second month of the latter period is due to the August holiday month, when practically every business establishment is closed for at least one week in this district.

A subscriber's traffic during the early months after the line is brought into use should reasonably show some growth. He may be assumed to have taken means of informing his friends or customers that he is "on the telephone." And, as the figures indicate, there is a rise practically each month consistent with such an assumption, and with the fact that the new subscriber meets with the experience common to most subscribers of finding an increasing benefit in the service, and is thus encouraged to more active use.

But it is seen that there is a much larger growth of traffic during the first month of the second period, and, comparing the average monthly increase during the two periods, there is a very considerable margin in favour of the latter period.

It appears consistent with the facts that this is mainly due to the advertising value of the Telephone Directory, which has stimulated an inflow of calls to the 100 new subscribers, and that this reacts upon the new subscribers and results in creating a corresponding outflow of calls, as represented in the large difference of valued calls made as between the two periods. I submit that this is so, apart from the usual automatic growth of the new subscribers' calls.

The economic benefit which may be claimed as traceable largely to the publication of the directory is that, while the calls made during the first period were 13.3 below the number actually guaranteed, this leeway was made up during the second period, and,



in addition, there was 11·2 per cent, *actual gain* in excess of the calls guaranteed, representing an increased earning upon the 100 lines equivalent to its cash value.

There is another phase of this relationship as between the potentialities of the measured rate subscriber's line and the value of the Telephone Directory, which, however, is not indicated in the figures given. As before stated, it may be safely assumed that there would be an equal *inward* flow of "traffic" from other subscribers during the whole full period the 100 subscribers were connected up.

About 50 per cent. of our stations in this district are still on the flat rate, and the benefit of the equal inward traffic would therefore only be 50 per cent., as the calls made by flat rate subscribers are in this respect of no value.

I referred to the adoption of the measured rate as a new era. It was considered necessary to boom this new era by liberal advertisement and by the publication and circulation of a considerable amount of literature, booklets, pamphlets, cards, etc. These have been most useful, and have, in the hands of the Contract Departments and the staff of the Company, materially assisted in promoting the large growth of this class of subscriber.

The Company is deeply interested, as I have tried to show, in promoting the growth of traffic upon all measured rate stations. The larger the volume of traffic carried the greater the revenue earned, and its resultant proportionate increased percentage of profit.

I referred earlier to railway companies and railway traffic. Like railway companies, this Company would benefit, I believe, by a freer advertisement of the "stations" to which it is prepared to carry its "traffic" by publishing monthly supplemental lists for each district. Telephone users would thus be provided with the latest additions in telephone subscribers' stations, and would institute valued calls in numerous cases forthwith.

If there are from 12,000 to 15,000 new measured rate subscribers connected up each half-year, the traffic on these lines is adversely affected from the lack of such advertisement, and, calculated upon the basis of the results I have given of the 100 new subscribers, the majority of these lines are as a consequence not carrying the call actually guaranteed, and neither the Company nor the subscriber gains the full economic benefit upon their outlay.

Instead of the subscriber and the Company securing the advertising value due to the directory in the eighth, seventh, sixth, fifth, fourth and third months after being connected, the benefit would accrue in the second or third, as I believe it will be found that there is the biggest growth of traffic during the two first months of new subscribers' lines and names being shown in the directory.

At any rate, the "peak" of the subscribers' load of calls might be anticipated months earlier than under present conditions.

In some towns newspaper proprietors have given space in their papers for a list of new subscribers joined up, and where this has been done I believe benefit has accrued. This was so in a district in which I formerly served, viz., Swansea. But while some benefit is derived in this way, I believe a small monthly *brochure* in each district, issued under official authority, would be more appreciated, and best serve the purpose. Its cost might be more than covered by the value derived from advertisements. It would form an excellent advertising medium from the fact that its circulation covers all grades and classes of the business community, and the wealthier portion of the middle and upper classes. It would be equally useful in setting forth the praises of "Breezy Blackpool," "The holiday haunts between Tweed and Humber," "Sunny Devon," "The delights of the Trossachs," etc., etc., as it would be in the display of "Bass's label," "Dewar's whisky," "H. P. Sauce," or the various cocoas with the "one and only flavour," "Bournville," "Cadbury's" or "Fry's," and the numerous enterprising London and provincial firms whose "displays" in the press or the hoardings are so artistically and tastefully shown.

*The Lost Call.*—In discussing the economic phases of the measured rate line some consideration must be given to the "lost call."

Many subscribers are connected up some considerable time before their names are published in the directory. During this time the knowledge of these subscribers' connection was confined solely to the particular exchange or area to which they belonged.

This information would not be available at any of the other exchanges in adjacent areas, in the same centre, or the same district, nor to the exchanges in adjacent districts.

In some districts the Post Office trunk calls between adjacent centres are considerable. In this district during a given period the total Post Office calls at 3d., the minimum fee, represented 77 per cent. of the total trunk calls during that period.

During the months therefore that new subscribers' names are not published any inquiry for a new subscriber in a distant town *cannot be satisfied unless* the enquiring subscriber is disposed to take the risk of instituting an inquiry call, and paying the fee. There must be innumerable instances daily amongst the Company's 1,600 exchanges of such inquiries being made which, from lack of such information, cannot be satisfied. In every such case the Company is under the risk of losing a valued call and the Post Office the loss of the trunk fee, both infinitesimal as a unit, but, taken in the aggregate in connection with numerous large trunk centres, the ultimate economic loss to both the Company and the Post Office must be considerable.

*The Lost Enquiry.*—Another unfortunate phase of the "lost call" is that in the absence of cohesion as between centre and centre, and district and district, the benefit of the "enquiry" is also lost. This will be best understood by an illustration.

An Oldham subscriber puts in an inquiry for a certain firm at Manchester. The name is not in the current directory, and the enquiring subscriber declines to make an enquiry call. The matter drops. Possibly a Stockport subscriber makes a similar request for the same firm with the same result, and effect. The firm at Manchester, as a matter of fact, may *not* be subscribers. The firm may have been canvassed repeatedly by the Manchester Contract Department, but ineffectually.

If, however, the information that firms in other towns as well as in the immediate centre were enquiring for them was forthcoming to the Manchester Contract Department a most valuable lever would be available for that Department to apply. Such collective information would possibly carry conviction that the telephone service was necessary and the contract negotiated forthwith.

If all exchanges and trunk exchanges were provided with a book of enquiry forms to fill up in respect of all such enquiries which they were *unable to satisfy*, and these were forwarded to and distributed by a central bureau, located in each official *provincial centre*, to the various exchanges or Contract Departments concerned, the result would be a larger and earlier growth of new measured rate subscribers.

A monthly telephone supplement, published for distribution amongst subscribers, would secure an increased and earlier flow of telephone calls or traffic upon existing subscribers' lines.

On the other hand, a less expensive monthly supplement, printed by Head Office and circulated amongst the various exchanges and trunk centres, *for official use only*, would place the various centres in a position to complete numerous daily enquiries during those prolonged periods as before shown, when new subscribers' lines may now be considered as in a semi-passively inactive condition, awaiting the appearance of the half-yearly directory.

In conclusion, may I add that the statistics given are those covering a period of depressed trade in the cotton industry, which of course tended to keep down telephone calls.

They may or may not be fully representative of subscribers' traffic here or elsewhere. But taken as they are do they not show some very large *margins* capable of being filled up as between calls made and calls guaranteed?

We must remember that the whole complexion of our business in regard to telephone traffic is changing. The old flat rate is gradually disappearing and the measured rate assuming huge proportions, as I have pointed out.

We are concerned with the telephone call now by reason of its individual and collective value.

In introducing these phases of the measured rate my object is to invite attention to and free discussion of these subjects in order to find out how, in this district, traffic returns, as well as "new business" returns, may be improved and how greater cohesion as between centre and centre and different telephone "trunk areas" in regard to "lost calls" as well as "lost enquiries" may be arrived at.

Column No.	Item No.	Form No. 574.	Total brought forward, Dec., 1907.		Total at quarter ending March, 1910.	Total at quarter ending
No. 1	1	Exchange lines on insts. . . . .	526	5, 5, 1, 2, 3 3. 1 1, 2, 1, 1	532	6, 1, 3, 3, 1, 3, 1
	2	Private " " " " " "	67		67	2 " " "
	3	Extension insts. " " " " "	72	1, 2, 6, 6, 1 " "	86	2, 1, 2, 3, 1 " "
	4	Party line insts. " " " " "	—		—	
	5	Cab shelter lines " " " " "	—		—	
	6	Interc. ms. on rental " " " " "	—		—	
	7	Fire posts with trans. " " " " "	—		—	
		Total stations " " " " "	665		685	
No. 3		No. 1 " " " " "	665		685	
	8	Ans. and emergency ans. insts. " " " "	9	1, 2 " " " "	12	
	9	Sales insts. maintained " " " "	31		31	
	10	Switchboards " " " " "	7	1, 1 " " " "	9	
	11	Hire purchase insts. " " " " "	—		—	
	12	Fire alarm posts " " " " "	—		—	
	13	Fireman's bells " " " " "	—		—	
	14	Electrophone sets " " " " "	3		3	
	15	Bell installations " " " " "	—		—	
	A	+ call offices " " " " "	15	1, 1, 1, 2 " " " "	20	
	B	Less C.B. insts. not to be inspected " " " "	—		—	
		Total stations to be inspected " " " "	730		760	
No. 2		No. 3, less Col. 8 " " " " "	721		748	
	A	Less call offices " " " " "	15	1, 1, 1, 2 " " " "	20	
	B	+ C.B. insts. not to be inspected " " " "	—		—	
	16	All exch. lines on sbds. " " " " "	12	1, 3 " " " "	16	1 " " "
	17	Sales insts. maintained free " " " " "	—		—	
	18	Private lines on sboards. " " " " "	6		6	
	19	External extension boards. " " " " "	25	1, 3 " " " "	29	
	20	Metaphones " " " " "	—		—	
		Total official and unofficial stations " " " "	759		783	
No. 4		Total of Col. 3 " " " " "	730		760	
		Less Nos. 10, 13, 15 and A " " " " "	22	1, 1, 1, 1, 1, 2 " " " "	29	
		+ Nos. 17 and B " " " " "	—		—	
			708		731	

In the past it has been an unfortunate policy to apply the same working instructions to all storage batteries irrespective of type.

It should not be inferred that articles which outwardly resemble one another are similar in composition and construction. Even Mr. Milnes falls into this error when stating:

"Negative plates are made of the pasted type (and I include the 'box' plates in this category) without exception by all manufacturers, and in all cases outlast the positive plates, so that the determining factor becomes the life and properties of the positive plate."

There are good, indifferent and even bad negatives on the market, and the characteristics of the various types differ very materially, apart from quality.

In drawing up instructions for the successful operation of a telephone battery, just as much consideration has to be devoted to the care of the negatives as to that of the positives.

Negative plates are liable to sulphating quite as much as the positives, but the results—if the sulphate is not reduced—are different. A sulphated negative loses capacity in that condition, and will commence to gas freely early on charge.

This doubtless is the true explanation for the negative plates gassing first in the batteries alluded to by Mr. Milnes, and lays the "bogy" of increased local action due to the antimonial grid.

Our experience goes to show that there would be less trouble in maintaining the plates of a telephone battery in a healthy condition, when doing very light work, if the engineers would curb a prevailing tendency to calculate the amount of charge required to an exact number of ampere hours by means of a lethargic and irresponsible recording meter. It is advisable to take into consideration all the various factors, which conjointly indicate a full state of charge.

THE CHLORIDE ELECTRICAL STORAGE CO., LTD.,

E. C. McKINNON, Chief Engineer.

[We have shown this letter to our contributor, and subjoin his comments upon it.—ED., "N. T. J."]

When referring to the positive plate, owing to its shorter life, being the controlling factor in the consideration of economy in a battery, I must admit I rather took a good negative for granted, the Company's experience being that there is not nearly so much apparent difference between the lives of negatives of different types as of positives.

Regarding attention to negatives, I assume that the same care in maintenance which prevents the sulphating of positives automatically takes care of the negatives also. I feel I must venture a protest against Mr. McKinnon's assumption of the telephone engineer's implicit and childlike faith in recording ammeters. (As to their lethargy and irresponsibility, I must leave Mr. McKinnon to be dealt kindly with by the makers!) As a matter of fact, there are 58 C.B. exchanges now open, and four only have recorders fitted, it being considered a safer practice, for a variety of reasons, and particularly where current consumption is small, to take ten or fifteen minute readings of an indicating ammeter over 24 hours when a fairly accurate estimate of output is required.

I am inclined to think, however, that in the past too much attention has been paid to a regulation of the battery, based on the input and output, and involving the assumption of an 80 or 85 per cent. (amp. hour) efficiency and an approximate estimate of the current consumption, and possibly an insufficient attention to specific gravity. J. R. M.

#### ECONOMIC PHASES OF THE MEASURED RATE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL

THE intensely interesting article by Mr. George Hey under the above heading in the JOURNAL for June appears to culminate in the two following sentences:—First: "Every facility which can be put in the subscriber's way to encourage and induce his increased use of the telephone, whether for inward or outward calls, is to the Company's benefit." Second: "In increasing the growth of traffic, or the sale of additional calls, the staff generally can do little."

As contract officer I keenly appreciate the truth affirmed, fully realising that though we lead the horse to the water, we cannot make him drink.

These two sentences from Mr. Hey are a concise but pregnant exposition of the Company's commercial faculty, and deserve comprehensive attention.

If the staff can do little to encourage the use of the telephone, what suggestions can be made to the management which would improve the service and increase traffic at minimum cost?

My constantly reiterated panacea is: "Auxiliary lines," but £4 yearly additional rental to a subscriber, whose one instrument remains unused for hours in the slack part of the day, is often more than he can be persuaded to pay. Now, if two lines could be offered with a minimum of 1,300 calls for £11 yearly, thus reducing engaged calls to zero, the facility might be much appreciated by reason of the lesser annoyance and greater satisfaction to the subscribers.

The cost of this improvement, falling entirely upon traffic, would mean a revenue of £3 instead of £5 for 1,300 calls—supposing all double line subscribers used the full minimum number; but by obviating engaged calls much time and trouble would be saved by the operator, and many fewer spares remain for the contract office to find or create new customers for.

Contract Office, Leeds.

J. H. CORLETT.

#### LONDON NOTES.

THE Company's officers are so accustomed to receive letters of complaint when a hitch of any kind occurs in the service, that they may be pardoned for thinking sometimes that subscribers forget altogether the general efficiency, and mark down the service as bad, because of occasional and exceptional trouble. It is all the more gratifying, therefore, to receive spontaneous testimony to special efforts made by our operators to assist subscribers in cases of emergency. Two such occurred in the Metropolitan area last month, one being at Croydon, where, owing to an accident at an isolation hospital shortly after midnight, urgent telephone calls were necessary; the other was at Woodford, also about midnight, serious illness necessitating prompt communication. Both subscribers wrote in very laudatory terms of the attention shown by the night operators.

Two interesting weddings have recently taken place—Mr. T. Meech, Senior Clerk-in-Charge of the directory work at Salisbury House having married Miss Ethel Button, who has been associated with him on the London Directory staff for some years. The other marriage is that of Mr. F. J. Fagg, one of the Rental Register Clerks, to Miss Q. Budd, Message Rate Clerk. Such a "double" event in one office is somewhat unique, and there was consequently a large gathering of the staff when the Chief Accountant presented the two couples with wedding gifts subscribed for by their colleagues. That to Mr. Meech and Miss Button took the form of a handsome ornamental clock, with inscription: the one to Mr. Fagg and Miss Budd was also a clock, with pair of side ornaments.

Another wedding was that of Mr. P. Joncke, Exchange Inspector, Holborn, to whom his friends on the staff presented a handsome pair of bronzes.

Our annual collection for the National Lifeboat Institution has just been handed in. The figures for each of the last three years are eloquent proof of continued interest by the staff:—

1908	..	..	..	..	..	£24	11	1
1909	..	..	..	..	..	£28	5	2
1910	..	..	..	..	..	£33	14	3

A very warm letter of thanks has been received from the organising secretary of the institution, and it is a great pleasure to pass his expression of gratitude on to the subscribers. Bank Exchange staff are especially to be congratulated on their contribution of £6 10s., including £3 10s. from a whist drive. The interest of one young lady whose father "earns his bread on the great waters" also helped very materially.

The death of Exchange Inspector W. A. Coolbear, Ealing, is sincerely regretted by all who knew him. Mr. Coolbear was quite a young man, being only 24; he entered the service in 1905. The cause of death was pleurisy and pneumonia.

THE Company's delegates on the Hospital Saturday Fund have arranged an outing to Hampton Court for July 9. It will be a good opportunity for members of the staff meeting each other under enjoyable conditions, if the weather be fine, and it is hoped will also result in a little profit to the fund. Launch parties are to be made up, and many will also no doubt be glad of the opportunity to explore the old palace and grounds, and wander amongst the glades of Bushey Park. It has been suggested that the staff subscribe more than sufficient to the Hospital Fund already, but perhaps the critics who think so do not always remember the benefits received by hundreds of the staff every year in the shape of hospital and dental treatment, special medical advice, and admission tickets to convalescent homes and sanatoria.

THE cricket match at Brighton was a huge success from every point of view. Blue sky and smooth shimmering sea greeted the London visitors on arrival; indeed, the weather conditions were ideal. At the Sussex county ground, where the match was played, a large number of spectators gathered to cheer on the respective teams. On so hot a day one rather envied the cricketers their cool white flannels, but felt no desire to emulate them in their unwearied pursuit of the ball. The Sussex team were outplayed all through, London putting on the satisfactory total of 203 for six wickets, while Brighton replied with 68, all out. The finish was very exciting. H. Phillips, who captained the Metropolitans, declared at 4.40 p.m.; as stumps were to be drawn at 6 p.m., this left an hour and a quarter for play. The last Brighton wicket fell at 5.56 p.m. amidst general cheers from the supporters of both teams. For the home side Jenner did well, carrying out his bat for 21; the next highest scorer was Goddard, with seventeen. The best London scores were Crow, 72, and Spittle, not out, 89. Two of the London bowlers had remarkable analyses—H. Phillips bowling three maidens, and taking two wickets for four runs; C. H. Phillips taking seven wickets for thirteen runs. As the latter is a son of the Southern Provincial Superintendent, his success against the Southern team caused some merriment. After the match about 140 members of the two stiffs had tea at the Aquarium, Mr. C. J. Phillips and Mr. Clay, the two Superintendents, also Mr. Cotterell and Mr. Lowe, the Assistant Superintendents, being of the party. At the conclusion of tea Mr. C. J. Phillips presented the London team with a special cup (not silver) as a memento of their victory. After one or two short speeches, Mr. Moorhouse, Sussex District Manager, expressed to the visitors the pleasure which it had been to himself and his staff to make all the arrangements and to act as hosts.

WHILST the cricket match was in progress at Brighton the Western Construction Department were having their annual outing at Chertsey. Sports, tea, and a concert at the "Cricketers' Arms Hotel," Chertsey Bridge, filled up the afternoon and evening. After a scant, hurried meal at midday, the fitters had good appetites, so that the substantial tea provided was appreciated to the full. To fill in the time between tea and the concert boating on the river was indulged in by a good number. Through the kindness of several contributors to the fund good prizes were available for the successful competitors in the sports. Thanks largely to the splendid weather, the outing was a complete success from start to finish.

#### NEWS OF THE STAFF.

Mr. ALFRED PERKINS, District Manager, Bristol, completed 30 years' service with the Company on June 1 last. A detailed history of Mr. Perkins' career with the Company appeared in the January, 1908, issue of the JOURNAL, and it is sufficient to say here that Mr. Perkins was the recipient of many congratulations and good wishes from his various official and unofficial friends.

Mr. A. LESLIE MAY, Exchange Manager, Leeds, was on his transfer to Bradford presented with a greenhouse as a token of respect from the operating staff at Leeds.

Mr. H. C. MAY, Engineer-in-Chief's Office, has, in the City and Guilds'



examinations held at Finsbury Technical College, taken first place in advanced mechanics (strength of materials) and first place in advanced mathematics (calculus).

Mr. H. C. GRAY, Engineer-in-Chief's Department, has, also at Finsbury Technical College, taken third place in advanced mathematics. This success, together with other certificates which Mr. Gray already holds, entitles him to the full technological certificates in the honours grade of both telephony and telegraphy and these also qualify him to be registered under the City and Guilds of London as a teacher of those subjects.

Mr. H. LEGGE, Engineer, Portsmouth, was presented on June 15 with a gold chain by the staff on his leaving to take up an appointment in Para, Brazil. He joined the service at Canterbury in 1891 and served at Margate, Colchester and Brighton, thus completing nineteen years in the Company.

Mr. W. P. RICHARDS has been promoted from Exchange Manager in Training to Exchange Manager for Sub-Exchanges in the Manchester district. Mr. Richards entered the Company's service on Oct. 11, 1901, and has been successively Exchange Inspector and Exchange Manager-in Training prior to his present appointment.

Mr. JOHN TUNN, Directory Department Glasgow, left the service on June 4 to go to Australia. Before his departure he was the recipient of a handsome gold Albert. Mr. Tunn carries with him the best wishes of his fellow workers.

Miss ANNIE MCKENZIE, Operator, Royal Exchange, Glasgow, who left on May 24 to go abroad, was presented with a gold bangle by the staff in her exchange.

Mr. J. N. LOWE was presented by the local and district office staffs with an oak smoking cabinet on April 19 as a mark of respect on his leaving Coventry for Leicester.

Mr. ALEX. ROXBURGH, Foreman, Paisley centre, has been promoted to be Assistant Engineer, Dumbarton. Before leaving, he was presented with a Gladstone bag, the presentation being made by Mr. Audsley, Local Manager.

Mr. JAS. LIVINGSTONE, Exchange Inspector, Paisley, has been promoted to be Chief Inspector, Dumbarton centre. Before leaving, he was presented with a silver cigarette case and a silver match box, the presentation being made by the Local Manager.

Mr. PERCY E. GRANT, who has been Local Office Clerk, Bath, for ten years, has been transferred to the Bristol district office as Stores Clerk. Prior to leaving Bath, Mr. W. C. Owen, Local Manager, on behalf of the Bath staff, presented him with a kit-bag and silver cigarette case as a mark of the high esteem and regard in which Mr. Grant was held by them.

Miss MARGARET E. EVANS, Operator, Cardiff, has been promoted to the position of Clerk-in-Charge, Penarth, vice Miss Baynham, resigned. Miss Evans joined the service in February, 1900, and was made Senior Operator in March, 1903.

Miss MAHEL ROSE STRANGE, Operator, Barry, left the Company's service on May 12 owing to the removal of her parents to South Africa. Miss Strange joined the Company's service in April, 1904, and was a very efficient operator. On leaving, her colleagues presented her with a silver photograph frame and expressed best wishes for her future welfare.

Mr. F. JOHNSON, Local Office Clerk, Southport, was presented with a handsome dressing case and travelling rug by his colleagues on resigning his post to go to Canada. The presentation was made by the District Manager.

Mr. W. A. TAYLOR, Stores Clerk, Bristol, has been promoted to the charge of the Bath office (26 exchanges).

Miss CHRISTIANA STRACHAN, Perth, was presented with a travelling rug on leaving the service to go abroad.

Miss HENRIETTA SLIM, Operator at the Barrow Exchange, left the Company's service on June 2 to go to Canada. She had been in the service five and a half years. She was presented on behalf of the staff in the Barrow centre with a travelling rug and an ebony-backed hairbrush as a mark of esteem. The District Manager, Mr. W. Taylor, made the presentation, and conveyed the good wishes of the staff to Miss Slim for her future welfare.

Mr. C. BLAKEY, Assistant Rentals Clerk, Sheffield, has been transferred to Hanley as Rentals Clerk. Prior to his removal he was presented with a port-manteau subscribed for by the members of the staff. In making the presentation, the Chief Clerk (Mr. Thyne) expressed the hope that every success would attend Mr. Blakey in his new position.

Miss ELSIE BUTTERWORTH, Operator, Rochdale, was on June 17 transferred to Southport. Prior to her departure she was the recipient of suitable gifts from the staff, who gave her a hearty send off.

Mr. B. B. BARCHAM, District Office Clerk, Norwich, has resigned his connection with the Company to take up farming in Canada. Prior to his departure he was the recipient of a travelling rug as a token of kindly regard and best wishes from his friends on the staff. The presentation was made by Mr. T. J. Clark, Chief Clerk, on June 16.

Miss E. G. ETHEL NELSON, Monitor, Nottingham, has been appointed Travelling Supervisor.

Miss FLORENCE DIXON, Supervisor, has been transferred to the position of Monitor.

Miss ADA STEVENSON, Operator, has been promoted to be Supervisor.

Miss EDITH FLEET, Travelling Supervisor, Nottingham, has resigned the Company's service in order to take an active part in her parents' business.

Fitter A. JONES, Nottingham, on resigning the Company's service was presented with a case of pipes by his colleagues.

#### Metropolitan Staff Changes.

##### Promotions and Transfers:

Mr. F. ELLIS, Apprentice, to be Assistant Engineer, Hop.

Mr. N. LAYTON, Inspector, Birmingham, to be Inspector, North.

Mr. R. A. COLLETT, Engineer's Clerk, Hop, to the Metropolitan Engineer's office, Salisbury House.

Mr. R. GILL, Clerk, Traffic Department, Salisbury House, to be Inspector, Avenue.

Mr. A. M. B. NEWITT, Inspector, Gerrard, to be Clerk in Traffic Manager's office, Salisbury House.

Miss D. R. STREATFIELD, Operator, North, to be Clerk, Rentals Department, Salisbury House.

Mr. P. J. BARNES, Fault Clerk, Holborn, to be Call Office Collector.

Mr. J. A. LEE, Engineer's Clerk, City, to be Daughtsman, Metropolitan Engineer's office.

Mr. P. SARD, Fault Clerk, Battersea, to be Inspector, Streatham.

Mr. H. C. DAVIS, Test Clerk, Sydenham, to be Assistant Engineer, Kensington.

#### Metropolitan Traffic Department.

##### Promotions and Transfers:

Miss ANNIE LIDDELL, Supervisor, Operating School, to be Senior Supervisor, New Cross.

Miss JEAN MITCHELL, Supervisor, London Wall, to be Senior Supervisor, Sydenham.

Miss CONSTANCE BOLTON, Supervisor, North, to be Senior Supervisor, Brixton.

Miss AMY BEAN, Supervisor, Gerrard, to be Senior Supervisor, Streatham.

Miss ALICE SCARFE, Supervisor, Avenue, to be Senior Supervisor, Bromley.

Miss ETHEL SNELL, Supervisor, Gerrard, to be Senior Supervisor, Gerrard.

Miss CLARA FRENCH, Supervisor, Holborn, to be Senior Supervisor, Holborn.

Miss CHRISTABEL THOMAS, Supervisor, Kensington, to be Senior Supervisor, Kensington.

Miss ALICE BOWLEY, Supervisor, Hop, to be Senior Supervisor, Hop.

Miss MARGARET WELLS, Supervisor, London Wall, to be Senior Supervisor, London Wall.

Miss THERESA CASEY, Supervisor, London Wall, to be Senior Supervisor, London Wall.

Miss MAUD DREW, Supervisor, Avenue, to be Senior Supervisor, Avenue.

Miss EDITH TRINGHAM, Supervisor, Operating School, to be Senior Supervisor, Paddington.

Miss ETHEL SOWERRY, Supervisor, Streatham, to be Supervisor, Operating School.

Miss KATHERINE HOWARD, Supervisor, Paddington, to be Supervisor, Operating School.

Miss LILY ROBINSON, Supervisor, London Wall, to be Supervisor, North.

Miss ANNIE FAZAKERLEY, Supervisor, Kensington, to be Supervisor, London Wall.

Miss BESSIE CHARLTON, Supervisor, Battersea, to be Supervisor, Kensington.

Miss FLORENCE CHESTERMAN, Supervisor, New Cross, to be Supervisor, Hop.

Miss JESSIE COOPER, Supervisor, Bromley, to be Supervisor, London Wall.

Miss CLARA CLARKE, Supervisor, Sutton, to be Supervisor, Avenue.

Miss LILIAN GOULD, Supervisor, Sydenham, to be Supervisor-in-Charge, Sutton.

Miss JANET BOOTH, Supervisor, Hop, to be Supervisor, Gerrard.

Miss ADA WINGFIELD, Operator, Gerrard, made Supervisor, Paddington.

Miss SYBIL MINNS, Operator, London Wall, made Supervisor, North.

Miss LETITIA BARKER, Supervisor-in-Charge, Sidcup, transferred to the East Kent district and promoted to be Clerk-in-Charge, Folkestone.

Miss MAHEL SHEARING, Operator, East, was presented with a gold pendant on her promotion to Avenue as Supervisor by the staff at the former exchange.

Miss BERTHA BROTHERWOOD, Operator at the same exchange, was presented with a gold locket on her promotion to Holborn as Supervisor.

Miss RUTH BRIGGS, Operator, Dalston, on her promotion to London Wall as Supervisor, was presented by her late colleagues with an ebony hair brush and mirror.

Miss ELIZABETH CLANFIELD, Supervisor, Brixton, on her transfer to Battersea in a similar position, was presented with an umbrella by the Brixton staff.

#### MARRIAGES.

Mr. J. T. TATTERSALL, Engineer, Hull, on the occasion of his marriage, was presented by the staff with a useful case of cutlery containing 84 pieces.

Mr. C. C. WORTE, East Yorkshire District Manager, on the occasion of his marriage, was presented by the members of the staff with a handsome ottoman.

Miss BEATRICE S. CLIFFORD, Supervisor, Bristol Exchange, has resigned to be married. Prior to leaving on May 26 the Traffic Manager, on behalf of the staff, presented her with a handsome marble clock as a token of esteem and regard. The supervising staff also presented, through the Clerk-in-Charge, a flower pot and pedestal. Several members of the operating staff also gave individual presents to Miss Clifford and she left with the best of wishes for her future prosperity. Miss Clifford had been in the Company's service fourteen years.

Miss ROSE PAYTON, Chief Typist, Birmingham, on leaving the Company's service to be married, was presented with a case of silver fruit knives and forks on May 21. The nature of Miss Payton's work brought her into contact with every department in the building, and the capable and tactful way she carried out her duties, coupled with a bright and charming personality, made her a great favourite with all the members of the staff. Good wishes for her future happiness and welfare, heartily endorsed by the whole of the staff, were nicely expressed by the Chief Clerk, Mr. Tucker, on making the presentation.

Miss CHRISTINA STEWART, Operator, Royal Exchange, Glasgow, resigned on June 1 to be married. The staff in her exchange presented her with a case of cutlery.

Miss AGNES O'REGAN, Operator, Central Exchange, Cork, on resigning to be married was presented with a dinner service subscribed for by the staff in Cork centre. The District Manager (Mr. Kidd) made the presentation.

Mr. L. A. FOX, of the Engineer-in-Chief's Department, Nottingham Factory, was recently the recipient of a set of cutlery from the joint Engineer-

in-Chief's and Factory staffs on the occasion of his wedding, Mr. J. W. Briggs making the presentation.

Mr. W. H. CLAYTON, Cabinet Maker, Nottingham Factory, was presented by Mr. T. H. Wallace, on behalf of the Cabinet Department, with a handsome curb on the occasion of his marriage.

Mr. H. TOPLIS, Labour Cost Clerk, Nottingham Factory, was presented by Mr. C. E. Fenton, Factory Manager, on behalf of the Factory and Engineer-in-Chief's staffs, with a roll-top desk and a "Thermos" flask on the occasion of his wedding.

Miss BARBARA N. BAYNHAM, Clerk-in-Charge, Penarth, left the Company's service on May 26 in view of her approaching marriage. The operating staff in the centre presented her with an electro-plated rose bowl as a mark of esteem and with best wishes for her future welfare.

Miss WINIFRED ALICE MORRIS, Portsmouth, was presented by the operating staff with a salad bowl and servers on her leaving to get married. The recipient, who was a favourite among the staff, also received many private presents. The presentation was made by Mr. S. J. Smith, District Manager.

Miss ALICE SENIOR, Operator, Sheffield, on leaving the Company's service to get married, was presented by the operating staff with a set of cutlery, as a token of their good wishes.

Miss HANNAH McLEAN, Operator, Dundee, was presented with a handsome dinner set on the occasion of her leaving the service to be married.

Mr. JAMES BROWN, Dundee, was presented with a timepiece on the occasion of his marriage on June 2.

Miss MARY A. TICEHURST was presented by the Walsall staff with a cruet stand and butter dish on the occasion of her marriage, the presentation being made by Mr. Dalton, Local Manager, Walsall.

Miss AMY TOMKINSON, Operator, Dalston, on leaving to be married was presented by the staff with a tea service and fruit bowl.

#### London Traffic Staff.

Miss CAROLINE COCKS, Operator, Avenue, on leaving to be married was presented by her colleagues with a dinner service and other presents from personal friends among the staff.

Miss BERTHA STAPLES, Operator, East, on leaving to be married was presented with a copper kettle and stand, also table mats.

Miss BEATRICE BARKIE, Testing Operator, on resigning from the East Exchange to be married, was presented with a tea service from the operating staff and a salad bowl from the maintenance staff. Numerous other gifts were received from individual members of the staff.

#### OBITUARY.

Apprentice E. G. NICOLI passed away, after a brief illness, on June 15. He entered the service of the Company May 8, 1907, and passed through the various departments. He was a favourite with the staff, and an all-round sportsman. As an outward token of respect a wreath was forwarded by the members of the Sheffield staff.

We regret to announce the death, from consumption, of Miss ADA WELSH, the Senior Operator at the Whitehaven Exchange, which took place on April 14. Miss Welsh had upwards of twenty years' service with the Company, the whole of which had been spent in the Whitehaven Exchange. A large wreath was subscribed for by the staff in the district as a token of respect. The Company was represented at the funeral by the Local Manager, Mr. J. M. Conway.

Miss ELIZABETH MATHERS PATTERSON, Operator at Edinburgh central, died on June 17. Miss Paterson entered the service two years ago, and was an unobtrusive attentive worker. Much sympathy is felt for her family. All departments contributed for a wreath.

### LOCAL TELEPHONE SOCIETIES.

**Dundee.**—The last meeting of the session was held on June 17, when a paper was read by Mr. Brown, District Manager, on "The Telephone Exchange Service."

**North-East London.**—The last meeting of the session was held at East Exchange on May 25, Mr. F. Morley Ward presiding. Papers were read by Messrs. W. Tuffnell and W. W. Gibson, entitled "Faultfinders' Duties" and "Instrument Inspectors' Duties" respectively. Both papers were followed by a good discussion on the part of the members, and afterwards the officers for the ensuing session were elected as follows:—President, Mr. H. S. Peck; vice-presidents, Mr. F. Morley Ward and Mr. R. P. Lowe; hon. secretary and treasurer, Mr. F. L. Sherburn; committee, Messrs. V. C. Crouch, G. J. Gadsby, J. Gardiner, W. W. Gibson, R. Ferguson, and H. Sharman.

**Sunderland and Shields.**—The seventh and last monthly meeting of the session was held on April 29, at Sunderland. Mr. E. Spink presided. The society agreed that the following books be obtained for the use of the members during the summer months, viz.:—*Telephony*, *Post Office Electrical Engineers' Journal*, and *Post Office Telephone Handbook and Guide to the Telephone Exchange*. A paper upon "Underground Work" was given by Mr. Robert Guthrie. The speaker dwelt upon the undermentioned items:—Laying of concrete blocks and three-inch pipes, splits and bends, laying of cables, testing and jointing of cables, pot-heads and cable heads, leading up to distributing poles. An interesting and instructive discussion took place on these items, the following members taking part:—Messrs. E. Spink, W. J. Douglass, J. G. Dixon, A. Livingstone, A. E. Tinwell, B. McNipp, W. McDermott, G. Heath, J. Smith, and J. Martin.

**Warrington.**—The members were treated to an exceptionally interesting lecture on April 20, when Mr. T. A. Prout, of Liverpool, president of the Society and Assistant Provincial Superintendent, wound up the second year's successful series of meetings with a paper, illustrated by lantern slides, on "A Telephone Retrospect and Prospect." He summed up the events of the last 90 years, more particularly since 1880.

**Weymouth.**—The sixth meeting was held on May 19, when a paper was read by Mr. E. Fletcher on "Stores Work," the chair being taken by Mr. J. A. Attwooll (Local Manager). The paper dealt with the processes of the debiting

and crediting of stores in detail, and outlined the duties appertaining to a store-keeper's position. It explained the use of the "stores transfer list," and stock queries were also touched upon. After the paper had been read a brisk discussion took place.

At the seventh and last meeting of the session, which was held on May 26, the vice-president being in the chair, a paper was given by Miss Hayman, Clerk-in-Charge of the Weymouth Exchange. The speaker detailed the various duties of an operator—the recording of calls and code marking. A useful discussion followed.

**Wolverhampton.**—A meeting was held on April 22, when Mr. C. H. Johnston, of Wolverhampton, read a paper on "Translators," in which, after describing the details of function and winding, he dealt with past and present practice and the possibilities of multiplex superimposing, illustrating his remarks by diagrams. The paper was followed by a keen and interesting debate. After this paper there were three competing ten minutes' papers read by the following—Miss Knowles (Walsall), "Operating Practices"; Miss Stanton (Wolverhampton), "Call Offices, from the Public User's and the Attendant's Points of View"; Miss G. Veale (Willenhall), "A Resident Operator's Duties." The prize was adjudged by the committee to Miss Stanton. The proceedings closed with a ticket-sorting competition for ladies only, in which eighteen members of the staff entered. The first prize was won by Miss L. Robinson, of Wolverhampton. Time for 300 tickets 20 minutes 28 seconds, which includes a penalty of 30 seconds for two errors, being fifteen seconds for each error. Several competitors showing better time lost by the rule disqualifying competitors making over three errors. The second prize was won by Miss G. Veale, and third by Miss E. Mather. This novel competition was very keenly followed and generally voted a most interesting success both on the part of the competitors and the lookers-on. Mr. W. S. Kay, Chief Clerk, Wolverhampton, took the chair. The prizes were in all cases adjudicated by the members of the committee present, and at the end of the evening were distributed by the District Manager, Mr. A. W. Smith. The arrangements for this competition were ably carried out by Mr. T. Reed of the Measured Rate Fee Department in the district office.

### STAFF GATHERINGS AND SPORTS.

**Edinburgh.**—*Bowling Match at Currie.*—A most enjoyable outing was spent on June 18, when three rinks of players representing the Edinburgh staff were opposed by a similar number of their fellow-workers from Glasgow. The weather was in keeping with the occasion, and the green—kindly granted for the event by the Currie B.C.—was in splendid condition. Twenty-one ends were played and the result was as follows:—Edinburgh, 63 shots (Mr. Miller 19, Mr. Bryce 14, Mr. Wilson 30); Glasgow, 61 shots (Mr. Patterson 17, Mr. Anderson 32, Mr. Curr 12); majority for Edinburgh, 2 shots. After the game those participating sat down to tea. The arrangements were carried out by Mr. Wm. Wilson, who has been entrusted to make arrangements for a return match at Glasgow.

*Amateur Golf Club.*—The Stewart medal competition was played at Musselburgh on May 21. Twenty-two members played and the medal fell to Mr. P. Veitch (Operator, Central). Messrs. D. Mathieson, W. Black, and A. Robson were the other prize winners. At the second round of the season a company of 71 were present. Steamer was taken from Leith to South Queensferry, and the company then walked through the Dalmeny Woods to Cramond, where tea was served and a varied musical programme carried through. Most of the party then walked into Edinburgh. The route taken and the fine afternoon ensured the success of the outing.

**Guildford.**—A successful outing which took the form of a river trip was held on June 11, a party of about 60 proceeding in small boats from Guildford up the River Wey to Bower's Lock, where a picnic tea was enjoyed. Sculling matches and inter-centre boat races, in addition to the usual running and walking races, added variety to the amusements. The chief events were the ladies' sculling race, won by Miss Hunt (Aldershot); inter-centre boat race, winners Aldershot centre; ladies' running race, won by Miss Crosby; and the gentlemen's running race, won by Mr. W. Hole. The prizes were distributed by Miss Loxton (district office), when a few fitting remarks were made by Mr. C. G. Ransley, the District Manager, who contributed much to the promotion and success of the outing, which was very ably managed by Mr. L. G. Cosh.

**Liverpool.**—*National Telephone Swimming Club.*—An interesting squadron race between Messrs. Elder, Dempster's Swimming Club and the National Telephone Swimming Club was held at Cornwallis Street (Liverpool) Baths, June 16. Six members swam for each side, and the result over twelve lengths was in favour of the National Telephone team, which finished eleven seconds in front of the time taken by its opponents.

**London.**—The Pelican (Night Operators) Cricket Club played their first match on May 23, at Battersea Park, against Whites and St. James' Club. A good and close game resulted in a win for the Pelicans by ten runs. Two previous matches had been arranged, but had to be abandoned on account of the wet weather. The club is very fortunate in having secured the support of Messrs. S. Cradock (president), J. F. Edmonds, C. T. Arrowsmith, and E. Flower (vice presidents); and a large number of the night staff have joined both as honorary and playing members. It is hoped the season will end as well as it has begun.

**Manchester.**—A swimming club has been started by the district office staff, and has met with such satisfactory support that it has now been thrown open to the whole of the staff in the Manchester district. A number of lady members of the staff have joined the club, and there is every indication of the membership being greatly augmented in the near future. The club have not yet so many good swimmers as their neighbours at Liverpool, but it is hoped that in the course of time they will be able to send their Liverpool colleagues a challenge. Mr. F. W. Taylor, the District Manager, was unanimously elected president of the club, and the secretary is Mr. A. W. Hewitt, district office, Manchester.

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## TELEPHONE MEN.

### LI.—LT.-COL. SIR ALBERT KAYE ROLLIT, D.L., J.P.

SIR ALBERT KAYE ROLLIT is a Yorkshireman, having been born at Hull, and a Londoner by education and business connections, for he was educated at King's College and the University of London, of each of which he is a Fellow, and also a Member of the Senate of the University and of the Council of his College. He took his B.A. degree, with first-class honours, in 1863; his LL.B. with double first-class honours in Laws and the Principles of Legislation, in 1864; subsequently he proceeded to his LL.D., double first-class honours, and became the University Gold Medallist in 1866; received the D.C.L. of Montreal in 1870, D.C.L. of Durham in 1890, and D.C.L. of Victoria in 1902, and subsequently the Litt.D. of Leeds. Then Sir Albert won the Incorporated Law Society's prize, and was elected to the premier position of his profession, the Presidency of the Law Society: he was chiefly instrumental in establishing, and drew up the report on which was founded, its great and most successful School of Law in 1903. Sir Albert was also District Registrar of the High Court of Justice and Registrar of the County Court at Hull for many years.

Sir Albert is a politician, both imperial and municipal, having been member of Parliament for twenty years, in which capacity he is said to have passed more Acts of Parliament than any other unofficial member, including the County Courts Act, 1903, which doubled the jurisdiction of those tribunals, and the Registration of Deeds of Arrangement Act. He has also been Alderman, Sheriff and Mayor of Hull in 1883-4-5. He is an Honorary Freeman of the City of Hull, and also of Huddersfield; Lieutenant of the City of London, and also of the Tower of London; Deputy Lieutenant of Yorkshire; and J.P. for the County of London, for the County of Berks, and for the Royal Borough of Windsor. He is also an Elder Brother of Trinity House. He is, too, a leader in Technical and Commercial Education, and a horticulturist, being President of the National Chrysanthemum Society, and an active member of the Council of the Royal Horticultural Society, and formerly for many years Chairman of the Hull Botanic Gardens. He is, moreover, interested in shipping and commerce generally, and was a Director of the Hull Docks and the representative of the Board of

Trade on the Humber Conservancy Commission. He is strongly opposed to the spirit of insularity, and has given practical effect to his opinions by an intimate and most varied connection with other countries. That he is much esteemed on the other side of the channel is evidenced by the fact that President Loubet made him an Officer of the Legion of Honour, and also of the French Academy, for his active service in favour of l'Entente Cordiale, the campaign for which he commenced at Bordeaux in 1895, on the occasion of the visit of the Lord Mayor of London, Sir Walter Gilbey, and

himself to the Bordeaux International Exhibition. Other honours that have fallen to him include those of Grand Cross of the Order of Merit of Portugal for Commerce, and the high distinction of honorary membership of the Royal Geographical Society of Lisbon; also Grand Cross of St. Sava for Science, Art and Commerce, Grand Officer of Belgium (Order of Leopold), of the Crown of Italy, and Grand Commander of the White Eagle of Serbia, the Lion and the Sun of Persia, and of China (the Double Dragon), conferred upon him by Li Hung Chang—whom he received as President of the London Chamber of Commerce; Knight Commander of Russia, Austria, Denmark (the Dannebrög), of the Rising Sun of Japan, and of the Meiji and the Osmanieh of Turkey, the Crown of Roumania, and of the English Order of St. John.

Among his many other avocations and pursuits Sir Albert was President of the Yorkshire Society, of the Society of Yorkshiremen in London, Lt.-Col. in the Royal Engineer Militia (Submarine Miners, Humber division), he having become a Volunteer on the first day Volunteers were enrolled in 1859, while he subsequently

raised a Volunteer, and afterwards a Militia, Division of Submarine Miners, with headquarters at Paull Fort on the Humber. As a Volunteer he was a marksman. He was for several years President of the Association of Chambers of Commerce of the United Kingdom, and also of the London and Hull Chambers, and also a Director of the British Chamber of Commerce in Paris, where for some years he had a residence.

Sir Albert was a steamship owner at Hull, London, Newcastle and Lisbon, as a member of the leading firm of Bailey &





Leetham—which had regular lines to Russia, Denmark, Germany, Belgium, the Adriatic and Black Seas, and carried the Royal Mails to Constantinople and to the Portuguese Colonies in Africa. Sir Albert Rollit has been, from its first foundation in 1891, and is still Chairman of the Statutory Inspection Committee of Savings Banks, in which he rendered honorarily for many years the best and most responsible public service, in the protection of between 60 and 70 millions sterling of deposits, in acknowledgment of which his portrait, painted by Sir Hubert Herkomer, R.A., and exhibited at the Royal Academy, was presented to him by the Banks; he has also served for many years in the position of President of the Municipal Corporations Association of Great Britain, consisting of the City of London and all the county and other municipalities; and he is a member of the Commercial Intelligence Committee, and also of the Shipping and Lighthouses Committee, of the Board of Trade, and, representing the Royal Horticultural Society, of the Joint Committee of the Education Department and the Board of Agriculture; also of the Council of Foreign Bondholders, and of the Local Marine Board of London.

It is his connection with the telephone, however, which will chiefly interest our readers. Sir Albert Rollit, as an electrician, took a great interest in Dr. Graham Bell's invention from the very first, and was presented by him with the second pair of telephones brought into this country. He was for many years President of the Hull Literary and Philosophical Society and other scientific societies, and frequently lectured on the subject in those early days and also upon the first phonograph invented by Edison. He was a member of the Board of the New Telephone Company, of which the late Duke of Marlborough was Chairman, and from the absorption of that company by the National Telephone Company in 1893 he has held a seat on the Board of the latter Company, of the Works Committee of which he is a member.

Sir Albert Rollit resides at St. Ann's Hill, near Chertsey-on-Thames, in the highlands of Surrey, formerly the home of the Rt. Hon. Charles James Fox, the eminent Liberal statesman of a century ago, and he is Commodore of the Thames Valley Launch Club, and owns the steam launch *White Rose of York*. Sir Albert has been married twice—to Eleanor Anne, daughter of Mr. William Bailey, J.P., steamship owner of Winestead Hall, Holderness, E. Yorks, by whom he has one daughter Eleanor Kaye, married to Captain Ellison, late 2nd Life Guards, of Boultham Hall, near Lincoln, and secondly, to Mary Caroline, Duchess of Sutherland, daughter of the Rev. A. Michell, D.D., Principal of Hertford College, Oxford, and Public Orator of the University.

Sir Albert is descended from Peter Rollit, who was French Secretary of State to Mary, Queen of Scots, and shared her imprisonment in Sheffield Castle, where he died. His tomb still bears the words "*Rollit, Gallus*."

Sir Albert is never tired of promoting the cause of education, technical, commercial and general; his principle is that a man should know something of everything and everything of something. He believes in the encouragement of learning by the institution of scholarships, and in the advantages of travel to widen the mental horizon. He is himself a man of wide and varied culture.

Sir Albert Rollit sat as a "Progressive and Independent Unionist" member for Islington (South Division) from 1886 to 1906. That his independence was no empty boast he proved by his action on the Free Trade question, which probably cost him his seat in 1906. The closing up of the Conservative ranks against Free Traders drove him into the Liberal camp, and he contested the Epsom Division of Surrey, near which he resides at Chertsey, in that interest in 1910, but without success.

Sir Albert is a keen business man and a ready and witty speaker—a fact well known to the staff of the National Telephone Company, for his speeches are one of the established institutions of the Annual Staff Dinner. On several occasions he has made special efforts, which were much appreciated by the staff, to attend this annual gathering. His good and always illustrative stories are proverbial.

#### NOTTINGHAM FACTORY OUTING.

A PARTY, comprising a number of the staff of the "Sundry Instruments Department," Nottingham Factory, had a splendid trip to Liverpool and New Brighton on June 25, the day being fine. The party travelled by reserved carriages, and landed in Liverpool about twelve o'clock noon, lunch being served on the train.

## THE TELEPHONE LOAD LINE.

By H. DEANE, Assistant Traffic Manager, London.

(Concluded from page 75.)

I pass now to the requisite staff an exchange demands in order to deal with its originating and incoming traffic. For any particular load line two points must be considered—namely, the staff required to deal with the traffic during the busy hour, and that required to deal with the day traffic. It by no means follows that the staff based on the busy hour traffic is that which can deal with the day traffic. We must, I think, agree with this principle: that just as it is necessary for a clerk to do a day's work so it is necessary for an operator to deal with a fair day's load. This naturally suggests that we should have figures representing fair days' loads for operators at different types of exchanges. Such figures are, as a matter of fact, much better to work upon, for general purposes, than anything else. The number of working "A" positions at an exchange is, of course, ascertained from the busy hour traffic, and they should naturally all be filled during the busy hour. When it happens that more "A" operators are required during the busy hour than are required for the day traffic we have to requisition the services of the half-time operator. It will be noticed in curve No. 4 that during the busy half-hour the operators appear overloaded. This is due to the fact that the number of working "A" positions is based on the busy hour which is usually less than double the busy half-hour as regards traffic. At Holborn, in October last, the busy half-hour was quite a rush period. If we had based the number of working positions on the busy half-hour traffic, we should have required four or five positions more than the number based on the busy hour traffic. We should also have had to employ four or five additional "A" operators at the switchboard during the busy half-hour. We see therefore the economic reason for taking the busy hour as the standard when considering switchboard equipment. By the busy hour is also meant the busy even hour, but there are some who think that this restriction is unnecessary.

Now if we wish to ascertain theoretically the number of "A" operators required to deal with the day traffic, we simply have to determine by the method I have already described the number of "A" operators required half-hour by half-hour. If we add these figures together, we obtain the number of operator half-hours required. Knowing the number of hours an operator works during the time she is on duty, we can easily calculate the number of operators required. If the number of operators required to deal with the day traffic exceeds the number of operators we require during the busy hour, it follows that some operators must come on duty after the busy hour is over. On the other hand, if the number of operators required for the day traffic is less than the number required during the busy hour, we must obtain the requisite number of individuals for the busy hour traffic by substituting two half-time operators for a full-time operator until the conditions for the day and busy hour traffic are satisfied.

Having once obtained the number of operators theoretically required to deal with the day traffic in this way, it is easy to ascertain for particular exchanges what day load each operator takes. In the lower portion of table G, I give the day loads for three exchanges obtained by actual calculation. For practical purposes, however, and for general calculations the day loads given in the upper portion of the table, are adopted. These loads allow a sufficient margin for the fact that in actual practice it is impossible to prevent some wastage especially in the arrangement of operators' meal times. If we used a strictly theoretical day load, we should sometimes find that it would be impossible to allow a considerable proportion of the operating staff to have lunch until late in the afternoon. The day loads at other than the standard type of exchange vary in the same proportion as the busy hour loads given in table D.

It is unfortunate that for general calculations we cannot employ a standard day load for "B" operators, any more than a standard busy hour load, but this point will be readily appreciated when it is considered that different kinds of "B" positions imply different loads.

TABLE G.

## "A" OPERATORS' DAY LOADS (VALUED).

C.B. (1) and C.B. (10) exchanges .. ..	1,250
C.B. (0) and magneto (S.R.) exchanges .. ..	1,190
Magneto (H.R.) exchanges .. ..	1,000

## "A" OPERATORS' DAY LOADS (VALUED) CORRESPONDING TO THEORETICAL NUMBER OF "A" OPERATORS REQUIRED: FROM OCTOBER, 1909, LOAD LINE RECORDS.

London Wall .. ..	1,376
Gerrard .. ..	1,333
Holborn .. ..	1,321

I shall conclude my considerations concerning the staff required as shown by the load line by briefly referring to the principle of anticipating the requisite staff between any two occasions on which the load line is taken. I believe that most traffic men are in agreement that this principle is a good one. In London, where there is large development, it is no easy matter to run the operating school on efficient and economic lines. In other words, it is difficult to draft operating staff into exchanges at a moment's notice without the possibility of having learners on the school staff for a longer period than necessary at other times. Suppose, however, it were possible efficiently to supply staff the moment it was necessary. Even then, under ordinary conditions, it takes some time to tabulate the necessary figures on which the staff is based, and we run the risk of supplying staff after a critical period has passed.

I have already given my opinion as to what should be considered a representative period of the year for load line purposes. Naturally if such records were taken periodically at equally busy seasons of the year, all we should have to do, when anticipating the requisite staff, would be to take into consideration what additional staff should be added on account of the growth of the system. Under present conditions, however, we have to take into account not only the growth of the system, but also the effect of the season. In table H, I give an example of the usual method employed, and this, I think, is sufficiently clear. It will not stand very hard criticism, but it has proved quite satisfactory for general purposes. It will be clear, I think, that if this principle is sufficiently accurate we should have the requisite staff on duty when the representative load lines of the year are taken. The example I have given happens to be an exception to the general rule that less staff is required in January than in the preceding October. Wherever it is found that the present staff is sufficient, but more staff is necessary three months hence, this additional staff should be supplied at intervals during the period in question and not necessarily all at once.

TABLE H.

## "A" STAFF REQUIRED AT DALSTON EXCHANGE IN JANUARY, 1910, AS CALCULATED FROM THE OCTOBER, 1909, LOAD LINE.

Valued originating calls per day (1 junction call = 1.6 local calls) .. ..	October, 1909	16,052
Valued originating calls per busy hour (1 junction call = 1.6 local calls) .. ..	" "	2,484
"A" Operators required on day load (1,250) .. ..	" "	13.6
"A" Operators required on busy hour load (200) .. ..	" "	12.4
"A" staff sanctioned .. ..	" "	13
Number of direct exchange lines .. ..	October, 1908	1,383
" " .. ..	January, 1909	1,451
Percentage increase .. ..	" "	4.5
Valued calling rate .. ..	October, 1908	10.8
" " .. ..	January, 1909	11.2
Percentage increase .. ..	" "	3.7
Number of direct exchange lines .. ..	October, 1909	1,792
Estimated number of direct exchange lines .. ..	January, 1910	1,858
Valued calling rate .. ..	October, 1909	9.5
Estimated valued calling rate .. ..	January, 1910	9.9
Estimated valued originating calls per day .. ..	" "	18,394
" " .. .. busy hour	" "	" "
(ratio of day to busy hour traffic 7:2:1) .. ..	" "	2,555
Estimated "A" staff required on day load (1,250) .. ..	" "	14.7
" " .. .. busy hour load	" "	" "
(200) .. ..	" "	12.8

With regard to the proper arrangement of operators' duties, this is to a great extent more an art than a science. There are undoubtedly certain general principles upon which the arrangement of operators' duties depends. What these principles are will be evident as we proceed, for it is my intention to approach the subject experimentally.

When an exchange has more than one division of operators it is the usual practice to make each division self-contained and self-supporting. Each division is allotted a certain number of operators, dependent upon the amount of traffic, and for whom a wheel of duties is arranged. The advantages of this system are considerable from an exchange organisation standpoint. The system demands, under the best conditions, the same number of positions and operators per division and the same wheel of duties per division. In practice this cannot always be managed in its entirety. The assembly of the switchboard often does not admit of the same number of positions per division. Further, the last division is seldom complete. In spite of these difficulties, however, it is essential to arrange wheels of duties in such a way that the operators in one division are not at a disadvantage compared with those in another division. The principle of regarding each division as complete in itself is illustrated in table I. The exchange concerned has 60 working "A" positions, arranged in five divisions of twelve positions. The number of operators required to deal with the day traffic is 65. In the first column we have the number of "A" operators theoretically required to deal with the originating traffic during each half-hour of the day. Our object is now to bring on duty the same number of operators per division, taking care that the total number coming on duty at any time is approximately what the traffic demands. In order to effect this, we can, in this particular case, and without much loss in efficiency, change the figures in the first column where they are not multiples of five so that all the figures become multiples of this number. We then make a preliminary trial, as shown, with regard to arrangement of duties. We bring the correct number of full-time operators, half-hour by half-hour, until all the positions are filled. As we require 65 operators to deal with the day traffic it follows that five operators must commence duty at 11.30 a.m. and work till 8 p.m., and that meal times must commence at 11.30 a.m. The total column shows that we have the correct number of operators until 11.30 a.m., but after 6 p.m. we have too few. Some operators must consequently do a divided duty, and the number of such operators should, where possible, be a multiple of the number of divisions. It will be seen, as a matter of fact, that five additional operators are required each half-hour between 6 p.m. and 8 p.m. Therefore five operators whose duty, in the table, ends at 6 p.m. must do a divided duty. Under ordinary circumstances we should not have a greater interval than three hours between the separate duties of a divided duty operator. Three and a half hours are usually worked during the first portion of the day and four hours during the second portion. As, however, a four hours' duty is too long without an interval, especially during the afternoon or evening, divided duty operators are usually allowed half an hour for meals or rest during the second portion of their duty. This is arranged by divided duty operators arriving half an hour earlier during the afternoon. In the final arrangement of duties shown in the table, five operators work between 9.30 a.m. and 1 p.m. and between 3.30 p.m. and 8 p.m. By referring to the total column of the final arrangement of duties it will be seen that we have the correct number of operators on duty between 8 a.m. and 11.30 a.m. and between 5 a.m. and 8 p.m. The next column shows the number of operator half-hours available for meals. The detailed arrangement of operators' meal times which follows is sufficiently simple to be understood without explanation. It will be noticed that the five divided duty operators have half an hour for meals between 4.30 p.m. and 5 p.m. Between 1.30 p.m. and 2.30 p.m. there are five more operators than actually required at the switchboard. Between 4.30 p.m. and 5 p.m. we have five operators short of the number required.

At the end of the table will be found the duties which must be arranged for each division. The complete wheel of duties covers thirteen weeks.

I have purposely chosen an arrangement of duties which does not involve too many complications, in order that the important principle of considering each division as complete in itself may not be lost in the complications which sometimes occur in practice. At certain exchanges it is sometimes impossible to arrange meal times so that the same number of operators leaves each division at particular times. The complications that arise on account of half-time operators, evening service operators and operators who are working under different conditions of service are well known,

ARRANGEMENT OF "A" OPERATORS' DUTIES ILLUSTRATING PRINCIPLE OF MAKING EACH DIVISION SELF-SUPPORTING. EXCHANGE WITH 60 WORKING "A" POSITIONS (5 DIVISIONS OF 12). SIXTY-FIVE "A" OPERATORS' REQUIRED ON DAY LOAD.

		8	8.30	9	9.30	10	10.30	11	11.30	12	12.30	1	1.30	2	2.30	3	3.30	4	4.30	5	5.30	6	6.30	7	7.30	8
Theoretical number of "A" operators required.. ..		10	14	23	45	55	60	60	60	55	45	36	34	47	54	55	55	55	55	50	41	23	15	10	10	
Practical number of "A" operators required.. ..		10	15	25	45	55	60	60	60	55	45	35	35	45	55	55	55	55	55	50	40	25	15	10	10	
Preliminary trial with full-time operators	8 — 4.30	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10								
	8.30—5	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5							
	9 — 5.30	..	..	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10					
	9.30—6	..	..	..	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20				
	10 — 6.30	..	..	..	..	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10			
	10.30—7	..	..	..	..	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	11.30—8	..	..	..	..	..	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Total ..	10	15	25	45	55	60	60	65	65	65	65	65	65	65	65	65	65	65	55	50	40	20	10	5	
Final arrangement of duties	8 — 4.30	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10								
	8.30—5	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5							
	9 — 5.30	..	..	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10					
	9.30—6	..	..	..	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				
	9.30—I	3.30—8	..	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	10 — 6.30	..	..	..	..	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10			
	10.30—7	..	..	..	..	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	11.30—8	..	..	..	..	..	..	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Total ..	10	15	25	45	55	60	60	65	65	65	60	60	60	60	60	65	65	65	55	50	40	25	15	10	
Operator half-hours available for meals .. .. .		..	..	..	..	..	..	..	5	10	20	25	25	15	5	5	10	10								
Meals .. .. .		..	..	..	11.30	11.45	12	12.15	12.30	12.45	I	1.15	1.30	1.45	2	2.15	2.30	2.45	3	3.15	3.30	3.45	4	4.15	4.30	4.45
Operator quarter-hours available .. .. .		..	..	..	11.45	12	12.15	12.30	12.45	I	1.15	1.30	1.45	2	2.15	2.30	2.45	3	3.15	3.30	3.45	4	4.15	4.30	4.45	
Lunch .. .. .	11.30—12.15	..	5	5	10	10	20	20	25	25	25	25	15	15	5	5	5	5	10	10	10	10				
	12 — 12.45	..	..	5	5	5																				
	12.15—I	..	..	..	5	5																				
	12.30—1.15	..	..	..	..	10	10	10																		
	12.45—1.30	..	..	..	..	..	5	5																		
Tea .. .. .	1 — 1.45	..	..	..	..	..	..	..	10	10	10															
	1.15—2	..	..	..	..	..	..	..	10	10	10															
	1.45—2.30	..	..	..	..	..	..	..	..	..	..	10	10													
	2.30—2.45	..	..	..	..	..	..	..	..	..	..	..	..	10	10											
	2.45—3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5										
Operators above or below traffic requirements	3 — 3.15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5									
	3.15—3.30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5								
	3.30—3.45	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5							
	3.45—4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10						
	4 — 4.15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10					
	4.15—4.30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10				
	4.30—5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	5		

Duty.	Lunch.	Tea.
8 —4.30	11.30—12.15	2.30—2.45
9.30—6	12.45—1.30	3.30—3.45
8.30—5	12.15—1	3 —3.15
9.30—1 3.30—8	—	4.30—5
9 —5.30	12.30 — 1.15	3.15—3.30
10 —6.30	1.15—2	4 —4.15
8 —4.30	12 —12.45	2.45—3
10 —6.30	1.15—2	4 —4.15
9 —5.30	12.30 — 1.15	3.30—3.45
10.30—7	1.45 — 2.30	4.15—4.30
9.30—6	1 — 1.45	3.45—4
11.30—8	1.45—2.30	4.15—4.30
9.30—6	1 — 1.45	3.45—4

Table J is a copy of a portion of our operating statistics. The first figures of interest are those in columns 8 and 9, which should always be considered together. If all the working "A" positions are not filled during the busy hour, an explanation should be forthcoming. Where the equipment per position is such as will produce the standard load during the busy hour, then all the positions should be filled during the busy hour. Among the smaller and older exchanges it often happens that the equipment per position is



insufficient to produce the standard load during the busy hour. This implies that the "A" operators can never work at their maximum efficiency. It sometimes happens that the "A" positions are filled during the actual busy hour, but not during the busy even hour.

TABLE J.

THE NATIONAL TELEPHONE COMPANY, LIMITED, TRAFFIC DEPARTMENT,  
LONDON.

OPERATING STATISTICS COMPILED FROM A ONE DAY RECORD (8 A.M. TO 8 P.M.)  
TAKEN DURING WEEK ENDING OCT. 30, 1909.

Type of Switchboard Equipment.	Derivation.	Gerrard. Stand.
1 Number of unlimited rate direct exchange lines (service lines included) ..	—	3,452
2 Number of message rate direct exchange lines ..	—	3,980
3 Number of measured rate direct exchange lines ..	—	263
4 Number of party line rate (main circuits) ..	—	264
5 Number of call offices ..	—	7,959
6 Total number of direct exchange lines ..	1 + 2 + 3 + 4 + 5	18,777
7 Number of exchange stations ..	—	99
* 8 Number of working "A" positions ..	—	99
* 9 Number of "A" positions filled during busy hour ..	—	99
10 Number of direct lines per working "A" position ..	6 : 8	80
11 Number of originating calls per day ..	—	110,424
12 Number of originating calls per direct line per day ..	11 : 6	13'9
13 Number of originating calls per exchange station per day ..	11 : 7	5'9
* 14 Number of originating calls per "A" operator per day (2 half-time operators — 1 full-time operator) ..	11 : 36 (B)	818
15 Number of originating calls per busy hour ..	—	14,614
* 16 Number of originating calls per "A" operator per busy hour ..	15 : 9	148
17 Originating traffic: ratio of day to busy hour ..	11 : 15	7'6
18 Average value of junction call in terms of local call ..	determined	1'6
19 Number of valued originating calls per day ..	11 valued	158,113
* 20 Number of valued originating calls per "A" operator per day (2 half-time operators — 1 full-time operator) ..	19 : 36 (B)	1,171
21 Number of valued originating calls per busy hour ..	15 valued	21,162
* 22 Number of valued originating calls per "A" operator per busy hour ..	21 : 9	214
23 Number of originating junction calls per day ..	—	79,481
24 Number of outgoing junctions (excluding junctions used exclusively for lending purposes) ..	—	745
* 25 Number of calls per outgoing junction per day ..	23 : 24	107
26 Percentage of outgoing junction calls ..	(23 : 100) : 11	72
* 27 Number of working "B" positions ..	—	33
28 Number of incoming junctions ..	—	846
* 29 Number of incoming junctions per working "B" position ..	28 : 27	26
30 Number of incoming junction calls per day ..	—	97,562
* 31 Number of calls per incoming junction per day ..	30 : 28	115
32 Number of incoming junction calls per working "B" position per day ..	30 : 27	2,956
33 Number of incoming junction calls per busy hour ..	—	13,471
* 34 Number of incoming junction calls per working "B" position per busy hour ..	33 : 27	408
* 35 Average busy hour load which "B" operators should take based on working "B" positions of different classes ..	calculated	325
36 Number of "A" operators sanctioned— (A) 1 half-time operator = 1 full-time operator .. (B) 2 half-time operators = 1 full-time operator ..	—	135
37 Number of "B" operators sanctioned ..	—	38
38 Number of "A" and "B" operators sanctioned in excess of working "A" and "B" positions ..	$(36(A) + 37) - (8 + 27)$	441
39 Number of supervisors sanctioned ..	—	14
40 Number of monitors sanctioned ..	—	9
41 Managerial, clerical and record staff ..	—	13

Type of Switchboard Equipment.	Derivation.	Gerrard. Stand.
42 Ratio of "A" and "B" operators to supervising staff ..	$(36(A) + 37) : (39 + 40 + C. in C.)$	6'9
43 Number of operators at private branch exchanges— (A) 1 half-time operator = 1 full-time operator .. (B) 2 half-time operators = 1 full-time operator ..	—	68 68½
44 Total staff on which relief is sanctioned (less residents) ..	$(36(B) + 37 + 39) : (+40 + 41 + 43(B))$	27½
* 45 Number of relief staff sanctioned ..	—	27
* 46 Number of absentees, including absentees at private branch exchanges ..	—	14

\* These columns are of special interest for purposes of comparison and should be carefully studied.

† Not including exchange manager or assistant.

‡ Record taken at these exchanges 8 a.m. to 10:30 p.m.

It is well to point out that if for some reason the requisite number of "A" positions is not filled during the busy hour, column 22 will be artificial. In the case of small exchanges where no "B" operators exist, and where the incoming traffic is dealt with by "A" operators, the incoming calls have to be valued and added to the originating traffic.

Columns 34 and 35 are interesting. We have a comparison between the actual busy hour loads handled and those which should be handled by "B" operators on the average when the various classes of "B" positions are considered. Unfortunately, however, the figures in column 34, if they differ from those in column 35, only give a general indication of the course to be adopted. We cannot make a simple calculation as we can for the number of "A" operators required during the busy hour. Each case has to be dealt with on its merits. It must be remembered that different groups of junctions have their particular busy hour, a point which, in practice affects the question.

The calling rate, the percentage of junction working and the ratio of the day to the busy hour traffic (columns 11, 26 and 17) are the three most important items in connection with the design of "A" equipment. Once we are sure of these items, and are satisfied that our junction call valuation is reasonable, everything else is comparatively simple.

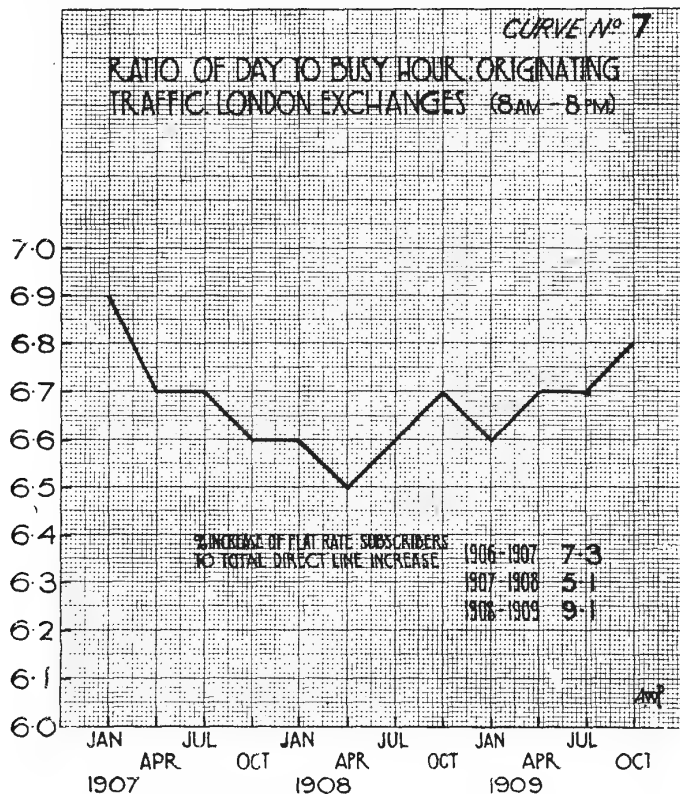
As regards the ratio of the day to the busy hour traffic, it is often difficult to estimate in particular cases the changes, if any, that will occur in this figure in the course of time. Speaking generally, this ratio decreased during 1907 and the first part of 1908. Since then the figure has shown a tendency to increase, as will be seen from curve No. 7. It is difficult to account for this change, unless it is assumed that there is some connection between the ratio and the class of subscribers connected. Everyone knows that during the past year the rate of connecting flat rate subscribers has increased. The figures I have given in curve No. 7 show this clearly. If there is any connection between these figures and the curve it must be that flat rate subscribers, on the average, distribute their calls during a longer period of the day than limited rate subscribers do.

A question which is often asked is to what extent we should expect this ratio to alter as an exchange increases in size. From an examination of three years' figures it would appear as if the ratio increases gradually as an exchange grows to about 350 direct lines, and then remains wonderfully constant.

The natural tendency of the percentage of junction working is to remain steady. Where an exchange shows variations in this figure, in the past, an explanation is generally simple. At Holborn, for instance, where the rate of increase in direct lines has been steady, the variation in the percentage of junction working has been negligible during the past three years. At Avenue, where the direct lines have decreased in number for some years, the percentage of junction working has increased gradually. This is naturally what we should expect. If there has been no development at an exchange for some time, the percentage of junction working usually increases because the system, as a whole, is increasing. At some exchanges, the development is great compared with that at other exchanges in the same group. Here the percentage of junction working will fall. London Wall Exchange is an example of this.

I will only speak of the rate of calling in very general terms. When the message rate system was introduced, the general rate of calling naturally began to fall. The average column in table K is

an indication that the past year or so has seen an end to this decrease, and that the general rate of calling is now increasing. It will be seen how the figures relating to the measured and flat services have shown a continued increase. The variations in the call office rate of calling are due probably to abnormal canvassing,



resulting in unremunerative call offices. The message rate of calling, with the exception of a slight drop in 1908, which accounts for the fall in the average also, has shown a steady increase. The figures relating to the party line rate of calling are unimportant as far as London is concerned.

TABLE K.  
RATE OF CALLING PER DIRECT EXCHANGE LINE PER WEEK FROM THE YEARLY RECORDS OF EFFECTIVE CALLS.

	Nov. 1904.	Nov. 1905.	Nov. 1906.	Nov. 1907.	Nov. 1908.	Nov. 1909.
Measured service ..	60.67	60.74	71.85	79.4	82.6	85.4
Unlimited service ..	77.4	74.75	60.44	50.8	60.2	78.9
Call offices ..	15.18	16.37	16.9	17.6	17.3	19.8
Message rate service ..	30.24	18.17	20	11.2	20.3	19
Party line service ..	45.97	42.49	42.22	43.48	43.22	45.42
Average ..						

When the traffic engineer, in the case of particular exchanges, projects these figures into futurity, he finds himself confronted with problems of absorbing interest. He also finds that it is essential for him to keep his mind free from bias and to avoid hasty conclusions. A conscientious man will, in a word, feel like Emerson, when he exclaimed:

"Give me truths:  
For I am weary of the surfaces,  
And die of inanition."

#### THE STAFF PENSION FUND.

MEMBERS of the Staff Pension Fund will be interested to hear that the Directors of the Company have appointed Mr. Samuel Herrick Sands to be an additional Directors' trustee of the Pension Fund Trust Deed, and the staff's trustees, Mr. Albert Auns and Mr. Frank Gill, have appointed Mr. Vincent Alsop to be an additional staff's trustee of the fund.

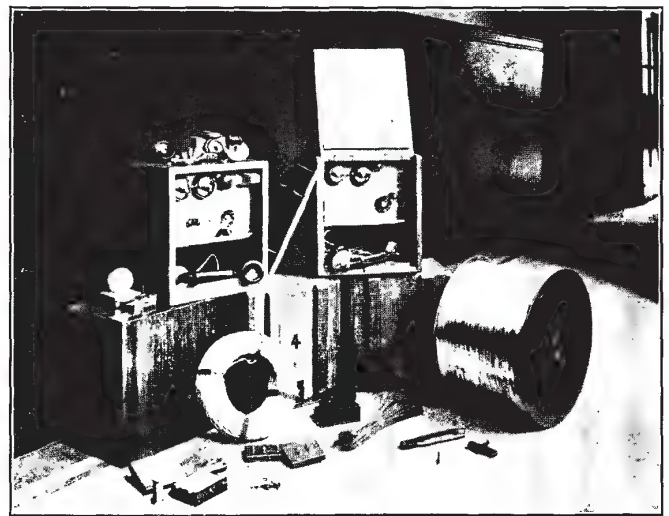
#### NOTES ON THE TELEPHONE INSTALLATION FOR THE BRITISH ANTARCTIC EXPEDITION, 1910.

By B. S. COHEN.

In connection with the presentation of a telephone installation to Captain Scott's Antarctic Expedition, an illustration of the apparatus will be interesting. In this photograph will be seen the five instruments in wooden cases. Two of the instruments with hinged lids are designed for fixing in the open on poles, where they will be used in connection with observations of the Aurora Borealis, and will require to stand the rigour of at least two arctic winters. Owing to the extreme dryness, due to the very low temperature, these wooden instruments will, it is thought, stand the exposure better than if placed in the open during a couple of English winters.

The lowest temperature the apparatus will have to stand will be about - 70 F., i.e. 102 of frost.

On the right is one of six drums of wire. The latter is bare uninsulated aluminium 19 S.W.G., and on each drum there is about thirteen miles, weighing 100 lbs. The drums are iron, and are of a convenient size to mount on the back of a sledge, from which the wire will be paid out. It will be laid direct on the snow, and, owing to the extreme dryness already referred to, no trouble from leakage is anticipated, although one of the lines



will be 26 miles long. Metallic circuits will be run, as it will probably be impossible to obtain an earth return. A number of McIntyre sleeves are supplied for jointing purposes. The instruments are Ericsson hand micro-telephones with the receiver and transmitter in series, and at the main but a common battery of 24 volts is inserted in series in the line circuits to provide talking current, as owing to the extreme cold it was not considered possible to fit local batteries at each instrument. The battery is not specially supplied for telephonic purposes, but is used also in connection with the scientific work of the expedition. It is interesting to note that the low temperature will improve the transmission over the aluminium lines by something like 15 per cent., owing to the increased conductivity.

The receivers and transmitters are supplied with wooden earpieces and metal mouthpieces respectively in addition to the ordinary ones, in case the latter, which are ebonite and celluloid, will not stand the low temperature.

An ample supply of spares has been included. The five instruments were built in one week at the Head Office workshops.



The photograph is by H. Kingsbury, of the Investigation Department.

[A letter has been received from Captain Scott, R.N., of the British Antarctic Expedition, conveying to the staff an expression of his gratitude and appreciation of their kind and generous interest in the expedition.]

## TELEPHONE WOMEN.

### LXXII.—EDITH DORAN.

Miss DORAN entered the service of the Company at Jersey as a Junior Operator in July, 1901, under her sister, who was at that time clerk-in-charge. At that period the principal exchange in the Island of Jersey was at Bath Street, St. Helier, in very inadequate premises. The switchroom was a small back room on the first floor, and the switchboards consisted of seven 50-line standard pattern boards bolted together, the operating staff totalled four, and the subscribers' lines terminating at this exchange were less than 300. Miss Doran did not, however, have long to endure the cramped conditions referred to, as new premises had been secured, underground cables laid, a 1,000-line multiple switchboard fitted in a room some 35 feet in length, well lighted and ventilated. The removal of the exchange thereto was effected in September, 1901, the transition being one that was greatly welcomed and appreciated by all the operating staff of those days.

Resignations and marriages of the staff had the effect of bringing about the gradual promotion of Miss Doran, who in October, 1908, was appointed as Clerk-in-Charge of St. Helier's Exchange. She now supervises a staff of six operators and



EDITH DORAN.

upwards of 700 subscribers' lines, and also keeps an eye on the general working of the junction lines that radiate to the fourteen sub-exchanges in the district.

Miss Doran takes her duties very seriously, and does her utmost to give satisfaction both to her subscribers and the Company. She is fond of reading and singing, and also takes a great interest in Sunday School work.

### LXXIII.—VICTORIA ADELAIDE SLATER.

Miss SLATER entered the Company's service at Bolton in January, 1897, at which period the area consisted of the central and four sub-exchanges, with 350 subscribers and twenty junctions for trunk communication. Her service of over twelve years covers a period of great development, the exchanges in the area having increased to seven, with 2,380 subscribers, or 3,280 stations, and there are now 130 junctions and record lines for trunk service.



VICTORIA ADELAIDE SLATER.

In May, 1907, Miss Slater was transferred as Clerk-in-Charge to Rochdale centre, which is a busy manufacturing town in the Bolton district. For two years she carried out her work in Rochdale in a very able manner, making her daily journey, which, in this rainy district, was a trying experience. In February last, however, she was rewarded by promotion to the more important position of Clerk-in-Charge of Bolton, her native town, in which position she is a most enthusiastic worker.

## SINGULAR FAULTS CAUSED IN UNDERGROUND CABLE.

By J. T. WHITELAW, Hamilton.

A PECULIAR fault developed not long since on the Company's underground cables at Motherwell, in the Mid-Lanark district. A 50-pair cable from a manhole to a distributing pole is laid in private ground in close proximity to the Burgh Electricity Works. For road-making purposes the burgh recently decided to tip and store on this vacant ground the ashes from the boiler fires in place of carting them to a free coup as had been done previously. These hot ashes generated such heat in the ground that the paper insulation within the Company's cable for a distance of about five yards was burned to a cinder, although the lead sheathing was in no way affected. This fault, to my mind, shows us that after underground cables are laid a careful watch over the whole route for alterations is necessary, more particularly where any section of a cable is laid on private vacant ground where the purposes to which that ground is put may be changed very frequently and result in damage to the Company's plant.





C. H. BRANDRETH. J. H. BIGLAND. W. V. PEGDEN.  
R. P. LOWE. G. W. LIVERMORE. F. P. MARTIN.  
R. F. CROW. W. F. TAYLOR  
(Contract Manager) G. E. NICHOLLS.

## LONDON AND ITS ORGANISATION.

### CONTRACT DEPARTMENT.

By J. STIRLING, *Metropolitan Chief Accountant*, and W. F. TAYLOR, *Metropolitan Contract Manager*.

"I CERTAINLY think that it is better to be impetuous than cautious, for fortune is a woman, and it is necessary if you wish to master her to conquer her by force; and it can be seen that she lets herself be overcome by these rather than by those who proceed coldly."

It is not necessary to commit oneself either to the letter of the doctrine proclaimed in those lines, or to the illustration by which it is enforced. Its spirit, however, must have actuated those who originated our Contract Departments, and must also have inspired much of the energy and activity which have characterised that branch of the Company's business ever since its inception.

The words quoted above, from a famous Italian statesman and writer, were penned four and a half centuries ago, but how applicable they are to many phases of modern life. In business to-day, "the race is to the swift, and the battle to the strong." Our strenuous bustling age demands of its sons a vigour and aggressiveness hitherto uncalled for. Like other enterprises, the telephone

industry has responded to the touch which modernism has applied to our commercial life; the work of our Contract Departments is the result.

Richard Whiting in *Little People* tells, in his own inimitable way, the story of an old man who kept a second-hand furniture shop. The poor man was, like his own goods, second-hand too. His methods, his notions were old; he labelled his stock at fancy prices which were the despair of the customer. The time came when the wayfarer, as he glanced at the shop, smiled and passed on. The old dealer labelled on a little longer, then succumbed. At the risk of labouring the obvious, and drifting into what the theologians call "apologetics," we say that no business concern—be it telephone or any other—can afford to sit still and wait for what chance may fling into its lap. This is not special pleading, but the fruit of experience; the gospel of "justification by works" is the only one that can have weight in business life.

Looked at from outside, London seems an unwieldy unit to control and provide for; when seen from inside, however, most of the difficulties incident to a huge and congested area disappear. Economic and effective distribution of labour, with a sufficient but not excessive amount of central guidance and supervision, form the simple combination which opens the formidable looking gate. The staff diagram (Fig. 1) shows how the contract forces of London are disposed, while at the head of this article is a photograph of the leaders who direct their operations.

It will be seen that the Metropolitan area is divided into six districts. In each of the six is stationed a contract agent, with offices at a convenient point for attacking the territory allotted to him; and with a staff of officers and clerks commensurate with the telephone possibilities. At Salisbury House is situated the contract manager's office, from which all general instructions are issued, and to which the divisional officers refer the knotty problems on tariffs and kindred topics which help to keep the mental hinges from rusting.

The City, with its square mile of wealthy streets, is the most important of the districts. Next is the Western division, with its panoply of rank and fashion. The others form a group of fairly equal potentialities, although of varying size and type. A comparison of the work dealt with for the twelve months ending March last is not without interest:

	City.	Western.	Other districts.
New stations ... ..	6,274	4,564	8,073
Removal orders ... ..	3,357	2,346	2,445
Orders for additional apparatus	820	704	1,828

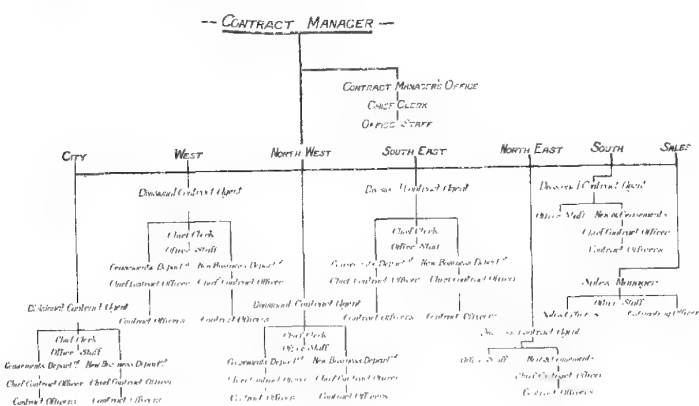


FIG. 1.

Procedure varies little, if at all, from that of the provinces, and need not therefore be detailed. Usually each "new business" officer has a definite slice of territory allotted to him, and he is not allowed, excepting under very special circumstances, to trespass on his neighbour's vineyard. With each division clearly mapped out, and each man's special preserve also defined, it becomes a simple matter to cover the whole of the area effectively, and at the same time prevent overlapping. If the first call on a prospective subscriber is abortive, a date for another interview is diaried, and entered on the "interview card"; the chief canvasser keeps a special watch on all these "call-backs."

The work of inducing subscribers who have given notice on their lines to continue for a further period is by no means the least important of a Contract Department's duties. In four of the London divisions special men are set aside for dealing with "notices to cease" only. In the other two contract divisions the ordinary "new business" men deal with cessations also, being assisted by the senior officers in special cases. The special staff numbers sixteen, four of these being clerical and the remaining twelve contract officers; they deal with 87.6 per cent. of the total notices received in London.

Financial difficulties of one kind or another account for most of our ceased lines, and a fair number of the cases dealt with are naturally hopeless from the outset. The preliminary difficulty to be encountered in the majority of cases, of course, is that the circumstances are known only to the subscriber, and any general argument may not apply to his particular case. In that very disadvantage, however, lies the opportunity for an intelligent officer who can, by judicious questioning and suggestion, get at the facts and from his experience combat the reasons advanced. Indeed, a subscriber's own admissions often form the strongest and most persuasive arguments for the retention of his installation.

To retain a station the loss of which is threatened, is now rightly regarded as even of greater moment than securing new ones. In the former, the Company stand to lose some capital

value on which, it may be, an adequate return has not yet been obtained, to have spare plant thrown on its hands, and thus earning no revenue, and to incur the cost of recovering equipment which was originally fitted at some expense. To preserve what is in existence, therefore, is financially better business even than large numbers of easily constructed new lines, desirable and welcome as these latter are.

The results achieved have on the whole been very creditable, and have justified the special watchfulness exercised by the Contract Department over all subscribers who desire to leave the telephone fold.

In every large undertaking, the existence of an amicable spirit in the relations between departments does much to make the wheels of business run smoothly. The contract staff probably experience the benefit of this friendly feeling as much if not more than any other section, for their success so often depends upon the work and co-operation of others. This is perhaps emphasised more in London than in other parts of the country, owing to the necessity for sectionalising to a much greater extent than will apply elsewhere. With the engineering officers especially does the Contract Department come in close touch, for development studies, estimates for new lines, prompt completion of orders, concentration of canvassing on the best paying areas, are all important matters of daily intercourse between the two, and a joint friendly settlement means absence of friction, the likelihood of satisfaction to the subscriber, and a moral as well as commercial gain to the Company. It is gratifying that this is thoroughly appreciated, and in the recent campaign instituted for the purpose of utilising spare plant before the end of the Company's license, the benefits of this reciprocal working were particularly noticeable. The card system in vogue for keeping a watch on spare circuits has recently been described in the JOURNAL, and need only therefore be alluded to here in order to say that it works well in practice, and is a simple yet comprehensive method of keeping both engineer and contract agent informed from week to week of the position in the various distributing pole areas.

Experiences of many sides of human nature fall to the contract officer's lot. Some are diverting, many are disappointing, all are instructive. We can probably place in all three categories the case of the lady who told her maid to say that "Mrs. ——— was already a subscriber to so many hospitals and other charities that she could not see her way to help the gentleman, although she had no doubt it was a deserving case." Boarding-house residents will doubtless sympathise with the lady who, when asked if she had a telephone connection, replied "No, and she didn't want one, as she had quite enough to do to look after her lodgers"; it transpired afterwards that the lady had some hazy notion that the wire would have to be attached to her person before she could get into communication with anyone.

Suburban London presents peculiar canvassing difficulties. About 90 per cent. of the houses are occupied by men who are "something in the City." As a rule, the City address will not be disclosed by the gentleman's family or servants, so that evening or early morning calls have to be resorted to. In the latter case, the chances are that "a rush to catch the train" is the rule of the establishment; in the former, the answer will probably be "I don't discuss business at home." It is indeed a case of Scylla and Charybdis; but as Ulysses was able, thanks to the advice of Circe, to steer his bark safely through the strait guarded by the two classical rocks, so the wise contract officer will seek to enlist the sympathies and support of the ladies in the household; that being secured, success is certain. In one case at least where an evening call was made, it seemed as if this desired result had been attained without any effort, for the door was opened by a young lady, who greeted the caller with "Come in, my darling; how late you are to-night." When the hall lamp revealed the case of mistaken identity, the result was somewhat disconcerting to both.

London's well-known cosmopolitanism results in the Company having considerable business transactions with men and women of various nationalities. The general view of the contract staff is that the foreigner is, on the whole, more difficult to deal with than the Englishman; he requires more explanation, is more suspicious, and generally less amenable to argument. His difficulties with the English language, too, are sometimes acute, the unconscious humour

of the misplaced words being amusing to the hearer at least. The writer of a recent letter certainly knew what he wanted, although his expression of it may be regarded as a trifle crude. "I should be obliged if you will send one of your representatives here to give us some information for the fixing of an operator on the limited or unlimited calls sisteme, and give prices as well." We can probably trust to the elusiveness of the sex to enable any operator to release herself from so unpleasant a position.

One feature of the Company's dealings with the foreign population of London may be of general interest. A few minutes' journey by omnibus or train from the heart of the City brings one into a new world, where the silk hat and frock coat of fashion would seem *bizarre* and out of place. Not only are the clothes of the people different, but their language is different too. In tram and omnibus and at street corner one hears the uncouth gutturals of

METROPOLITAN CALLS ONLY.  
AUTOMATIC BOX.

(C.B. Working)

דיא נאשיאנאל מעדעפאזא כאמפאני, למד.

פובליק קאלר (רוה) אפפוס.

טאריה.

לאהאלע רופונגען.

פיר יעדע 3 מינוטן שפעטער, אדער איין מהייל דאס (ס"א)  
אנשטאנען אדער ערהאלטען ווי מען צאלען 2 פענס פיר דאס נוצען  
פאר קאלר אפפוס.

בעמערונג.

אום צו רופען די עקסטענזש.

לייגט דעם רעכטער (הערער) צום אויער (אונטער) נעמענדיג דעם  
טעלעפאן פון פלאץ, גיבט דעם צייכען צו די עקסטענזש (אונטער) דעם  
אפערטאר איין נעגליש דא "עקסטענזש" אונט "נומער" פון דעם  
סופערטריבער ווערען עס ווערט פערלאנגט. דאס ווארט מיט'ן רעכטער  
צום אויער, טייטש דער אפערטאר זאגט: דא וועט איהען אנגענומען.

ווען עס ווערט פערלאנגט ביים אפערטאר.

אונט'ן נישט פריהער לייגט אריין א פענע

איין דעביל אונט דרעקט דאס הענטל, נאכהער לייגט אריין נאך 1 פענע,  
אונט דרעקט נאך אמאל דאס הענטל, ווייטער האלטענדיג דעם  
רעכטער צום אויער, דער אפערטאר מען נאכדעם דאס געלט.  
צוכונגען אדער מרובע פענעס זאל מען נישט נוצען.

אויס מען פערלאנגט מער ווי 3 מינוט צו רידען, וואס מען עקסטאר  
געלט אריינלייגן ווי עס ווערט פערלאנגט ביים אפערטאר.

ווען איהר רידען איין גענערינג לייגט דעם רעכטער צוריק אויפן פלאץ

Fig. 2.

a strange tongue; from shop front, music hall, and newspaper placard, curious-shaped letters stare at one. It is Yiddish, that quaint combination of ancient, mediæval, and modern, which to the present-day Jew of humble birth has replaced what Longfellow has called "the grand dialect the Prophets spake." So to advertise, and make more useful, the public call offices in those neighbourhoods, where the Jewish people most do congregate, special bell signs, with the words "Public telephone" inscribed on them in



Fig. 3.

Yiddish, were exhibited at the call office premises, and instructions for using the call office instruments were also got out in the same language, and posted alongside the instruments. A sample of the former is given in Fig. 3. of the latter in Fig. 2.

(To be concluded.)

#### REVIEW.

*The Journal of the Municipal School of Technology, Manchester. Volume II, 1910, 297 pages.*—This journal, which is printed by the school in its Printing Crafts Department, forms a record of the investigations undertaken by members of the staff of the several departments of the Municipal School of Technology, Manchester. It comprises chiefly papers reprinted from the journals of technical societies and from other technical periodicals. Volume II deals with the work published during 1908; approximately one-half of it is taken up by contributions on electrical subjects, and the remainder by papers on chemistry and on the technology of cotton spinning. Among the electrical papers those of chief interest to telephone men are Professor Haldane Gee's encyclopaedic paper before the Institution of Electrical Engineers on "Electrolytic Corrosion," which is one of the most useful essays on this complex subject ever published, and two papers by Messrs. William Cramp and C. F. Smith on "The Alternating Current Circle Diagram" and "Vector Algebra." The latter contains a very clear and succinct derivation of the equations determining the characteristics of an alternating current transformer. Professor Schwartz's paper on "Fuse Phenomena" and Mr. W. Cramp's on "The Electric Discharge and Production of Nitric Acid" are also reprinted.

The journal forms an admirable expression of the enterprise and energies of the authorities and staff of our great Lancashire technical college, and affords an example which might well be followed by some of our leading London schools.

Apart from its value as a work of reference, it has the effect of identifying the researches carried out with the school, and so stimulating that *esprit de corps* which is to a large extent lacking among the graduates of our technical colleges.

#### OPERATING LECTURES IN A CONVENT.

Miss E. M. Jones, matron of the Liverpool Traffic Department, had a unique experience during a holiday in Belgium, where she stayed for several days at the Ursuline Convent (*Pensionnat des Ursulines*), Thildonck, Wespelaar. In the course of conversation Miss Jones had occasion to refer to her connection with the telephone. Learning that she had held a position as schoolmistress in the Company's Liverpool Operating School, the nuns expressed a wish to know more about her work, and the Reverend Mother-General (head nun in the convent) requested Miss Jones to give the students an outline of the instruction which learners received in the operating school.

A lecture was accordingly delivered to the English-speaking residents of the convent, about 100 girls and twenty nuns being present. So delighted were the hearers that a further lecture was asked for, and again Miss Jones complied. In these two lectures



practically the whole range of subjects in which the telephone learner is instructed was touched upon.

The lecturer endeavoured to convey to her audience the appearance of a telephone exchange, and having no explanatory photographs, indicated by means of blackboard illustrations the general design of a switchroom, the switchboard, and its accessory apparatus. To this picture were added the continuous line of operators, the supervising staff and monitors, etc.; and the entire *personnel* of the switchroom and the correlation of their duties was briefly explained.

The lecturer then described the comfortable apartments which are now provided for the operating staff—the kitchens, dining-rooms, sitting-rooms and sick-rooms. The equipment of the latter, Miss Jones informed her hearers, included a medicine chest where restoratives of every kind were in readiness.

A description of fire-drill in a telephone exchange greatly interested the girls, the lecturer taking the opportunity to point out that the discipline observed by the staff at such times, as well as in the ordinary course of their duties, was equal to that demanded in an institution such as their own.

Throughout the lectures the audience showed the keenest interest and appreciation, and several questions were asked bearing on supposed detrimental effects arising out of the strain of an operator's work and the wearing of headgear telephones.

To have added to the knowledge and delight of the students in a foreign institution of such prominence is an experience which Miss Jones regards as a privilege and an honour, an experience made the more interesting by circumstances which were at once unexpected and unique.

## THE ANNUAL MEETING OF OFFICERS.

### THE POSITION OF THE STAFF.

THE usual Annual Meeting of Officers was held at Hamilton House, London, on June 24, when thoughtful and valuable papers on "Utilisation of Spare Plant" by the Chief Officers of the London staff, by Messrs. E. J. Hidden (Liverpool), A. M. Kidd (Cork), A. R. Lamb (Greenock), O. W. Stevens (Norwich), W. A. Valentine (Glasgow) and E. Williamson (Birmingham) were discussed. After some opening remarks by Mr. Goddard, interesting criticisms on these papers were contributed by Messrs. W. F. Taylor, A. M. Kidd, A. R. Lamb, W. A. Valentine, E. Williamson, L. Harvey Lowe, R. C. Bennett, E. S. Cooper, C. S. Wolstenholme, J. H. Rodger, Eustace Hare, F. Douglas Watson, P. F. Currall, E. J. Gillett, A. E. Cotterell, A. E. Ruddock, W. Napier, W. R. Senior, E. L. Preston, W. E. Gauntlett, D. Fulton, J. Stirling, R. A. Dalzell, J. L. McGrath, L. Price, J. L. Brown, A. B. Gilbert and A. Watts. Mr. Gill then addressed the meeting, after which Mr. Goddard, in summing up, made the following reference to the position of the staff:—

'Before winding up the proceedings there are one or two things I want to allude to, and the first and most important, from one point of view, although it is not quite germane to the subject of the meeting, is that raised by Mr. Lowe on the subject of 'staff.' It is an extraordinarily difficult question to deal with—that of the staff. I do not suppose that when the President, Mr. Gill and myself are in London, a day passes without our spending some considerable time in considering how the inevitable difficulty that has to be faced in reference to the staff can be either avoided or in some way mitigated. It is, I know, suggested that we should make all kinds of arrangements with the Post Office. Well, it takes two parties to make an arrangement, and the arrangements that we try to make are extremely difficult to carry through. I do not know why; but, whatever the reasons are, the facts remain that negotiations are extraordinarily difficult and take an inordinate time.

"We are trying to devise all kinds of methods by which we can help the staff. I know it is very difficult for the staff to realise that. We are, almost of necessity, looked at as the men who are sitting here, and who, apparently, do nothing, but I can assure you absolutely sincerely that if that impression exists, it is not a right one. We are, as far as we can, and of course having the interests

of the shareholders and the Company constantly in our minds, trying to mitigate any hardship to the staff, and we are doing that, I think I may say, quite unselfishly.

"Mr. Gill suggests to me, and I commend it to your attention, that the subject we have been discussing to-day indicates one of the best ways of helping the staff. If you can use up your spare capacity you are going to employ your line and instrument staff and canvassers. The devising of every possible method of doing this is, at all events, one way in which you all individually can help to employ the staff in your district."

### (A GLASGOW CORRESPONDENT'S IMPRESSIONS.)

THIS meeting, which has become an institution, has again come and gone.

Attending the meeting are all sorts and conditions of men; the *blasé* member who has attended every meeting during the last sixteen years, and knows all there is to know of telephones, and the alert, open-minded officer who has come with the intention of getting all he can in the way of information.

English, Scottish, Irish and Welsh—we do hear them speak in their different dialects.

The businesslike chairman has his clock beside him and keeps the discussion within bounds, the inexorable six-minute gong pulling up the lengthy speaker.

We hear the various opinions of men in the fighting line and the matured opinions of men whose views we respect, and a good effect is produced which bears fruit.

One of the most interesting features of the meeting is undoubtedly the fact of seeing and hearing the men whose names are household names and whose personality for the rest of the year is seen only in correspondence. The more personal touch is experienced; we rub shoulders with one another and angles are knocked off. We find that our opinions and views, no doubt carefully formed, are overturned and fresh light is thrown on all the problems tackled. Impressions remain with us of the various men we have seen and heard and friendships are formed and renewed.

The annual meeting is an asset. Is it doomed?

## GLASGOW NOTES.

THE Scottish contingent for the Officers' Annual Meeting travelled from Glasgow in reserved carriages.

"Shop" is supposed to be barred on such occasions, but who ever heard of a body of telephonists travelling together without raising the inevitable and always interesting telephone question in its most recent phase—spares, inventory, or something else.

A stranger travelling in an adjoining compartment must have wondered at the alternate dour discussion and hearty laughter.

ON the afternoon of Saturday, July 2, an interesting golf match was played at Hamilton between Scotland East and West. Fourteen couples took part, and although Edinburgh and Glasgow supplied the largest quota on their respective sides, there were also representatives from Berwick-on-Tweed, Galashiels, Kirkcaldy, Greenock and Kilmarnock.

The course is situate in the private policies of the Duke of Hamilton's magnificent estate, and the arrangements, which were carried out in a very capable fashion, were in the hands of Mr. Whitelaw, the Hamilton District Manager.

The results of the match were as follows:—

EAST.				WEST.			
R. Allan	Edinburgh	..	0	J. Lowe	Greenock	..	1
J. H. Allan	"	..	0	W. A. Valentine	Glasgow	..	1
R. McHardy	Berwick	..	0	A. Ramsay Lamb	Greenock	..	1
T. Elliot	Galashiels	..	$\frac{1}{2}$	J. A. Swanson	"	..	$\frac{1}{2}$
W. Knox	Edinburgh	..	0	W. Lang	Glasgow	..	1
R. C. Wilson	"	..	0	T. Pettigrew	"	..	1
R. Inglis	Kirkcaldy	..	1	A. Niven	"	..	0
C. Macfarlane	Edinburgh	..	0	G. Martin	"	..	1
H. T. Main	"	..	$\frac{1}{2}$	D. B. Heberton	"	..	$\frac{1}{2}$
A. F. Dunn	"	..	$\frac{1}{2}$	W. Allan	"	..	$\frac{1}{2}$
J. Robertson	"	..	1	R. F. Gilchrist	"	..	0
C. L. Stewart	"	..	1	G. Millar	"	..	0
R. B. Rae	"	..	0	J. F. Scott	"	..	1
A. Lumsden	"	..	1	G. A. McDonald	Kilmarnock	..	0
5 $\frac{1}{2}$				8 $\frac{1}{2}$			

ON the occasion of his transfer to Dublin as Wages Clerk, John B. Hamilton, Cash Office Clerk, was presented by the Glasgow office staff with a Saratoga trunk and kit-bag.

JOHN McMAHON, Collector, who has resigned his position, was presented with a gold Albert as a token of the good wishes of the Glasgow Staff Office.

*Bell Golf Club.*—The monthly medal for July was held at Carntyne on Saturday, July 9, when Mr. A. G. Thomson was returned the winner with the nett score of 81.

## The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

*Published Monthly at*

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VOL. V.]

AUGUST, 1910.

[No. 53.]

### CHARACTER.

LORD SELBORNE, in his recent speech on Founder's Day at Winchester, said:

"I wish now to say a word to those who are going to be the future workers for the King and Empire. I say workers, because there are too many loafers in England, and Winchester is not going to turn out loafers. Between the rich man who does nothing but amuse himself and the tramp there is really no moral distinction. The only difference that I know is that one is presumably clean and the other was certainly dirty. (Laughter.) All work falls under two divisions, the work of thinking and the work of thinking and doing. All my experience has been with the latter class. What is the kind of man I want to help me in my work? It is not easy to find suitable men. The Empire is strewn with the wrecks of scholars and athletes who lack something which is far more important than Greek iambics and cricket. When I want a man to help me, I do not ask in the first place what class he got or what his intellect is, still less do I ask whether he was in Lord's. The question I ask is, Can I trust him? That is a short sentence, but it comprises a great deal. Can I trust him to obey my orders? A man you cannot trust to obey is a nuisance to be eliminated at the first opportunity. Can I trust him to command? The man who cannot command is a broken reed. Can I trust him to rely upon himself and not to come to other people for support or advice in an emergency? The man who cannot rely upon himself will never be fit for anything but an inferior position. Can I trust him to give me the whole of his strength in the work entrusted to him? If not he is playing me false. Can I trust him not to think of himself? There is no greater nuisance in the world than the man who is always asking himself 'How does this affect me?' or 'Have I been sufficiently considered?' He is a creature who has lost all perspective, and he never sees things in their true proportion, because his own miserable self is always dwarfing the

landscape. Can I trust him to be straight? There is no use in the best intellect or the best education if a man is an intriguer or if you cannot rely upon his word. Now if I find that a man answers to these tests, then I go on to inquire about his intellect and his education and his physical qualifications."

LORD SELBORNE further said that moral courage is the greatest of all qualities in this world, and that of these three: muscle, brains and character—by far the greatest is character.

Upon this inspiring text many a fervent and eloquent sermon might be preached. To preach, however, is not our intention or our *métier*, but only to make some comments from our own point of view. LORD SELBORNE'S pregnant words, while they apply to everyone who in the larger sense by doing his duty is serving his country, have a direct significance for the staff both as servants of the Company and as prospective servants of the State. The qualities which he enumerates may be grouped under two heads: the simple one of faithfulness or trustworthiness, and the more elusive and all-important one of character; for the one by no means necessarily includes the other. A man may be possessed of that characteristic which enables him readily to rely upon himself, to assume responsibility, in short, to lead men; but he may do so for his own advancement and without any sense of faithfulness to his employer. Another man may be the soul of loyalty and work eagerly for the advancement of the undertaking with which he is associated and yet be totally lacking in those forceful attributes which are roughly denominated "character." The ideal servant must, without doubt, combine the two quantities, and happily the possession of the first is often accompanied by the second. Certainly the man who possesses neither is "a nuisance to be eliminated at the first opportunity," as LORD SELBORNE has it.

The man who is naturally deficient in "character" may remedy that defect to some extent—though with great difficulty—by application to duty; for character may be built up by slow degrees from the successive experiences of life. He who serves with zeal, who is trustworthy in all things, who obeys orders faithfully, and makes himself proficient in his work, must imperceptibly acquire the makings of "character." If he has not that gift of rising to an emergency, of acting rightly when faced with the unexpected, which is perhaps only born in a man, at least his ripe experience will give him a very good substitute for that gift—that knowledge which is power, and confidence in himself.

The shirking of responsibility is a form of moral cowardice which those situated in any grade of an administrative body ought to avoid. It is the counterpart in civil life of hesitancy to face the enemy in military. It is a failure to neglect to accept the chance of exhibiting one's capacity. To accept responsibility when occasion arises does not always require abnormal nerve or a congenital aptitude for action at a moment's notice. It does, however, require self-reliance and thinking for one's self, both of which qualities may be acquired. Indeed, the second is one of the most imperative needs of the adult and the lack of it the most fruitful cause of all that illiberality or narrowness of thought, misjudgment, false sentiment, hypocrisy, parrotry, snobbery, worship of the mediocre; of all that encouragement of quackery, of inferiority, of whatever is easy, futile and not worth doing, having or knowing; and of all those other vices engendered by thinking

in herds. A man who can really think for himself will go far, for he may rest assured that he is one in a thousand.

It is not to the higher grades of a staff alone that Lord SELBORNE'S words apply. The necessity of doing something outside one's daily routine, something perhaps not provided for in rules and instructions, arises at times for everyone. The junior who may chance to be in the office after closing time often has the opportunity of dealing intelligently with a subscriber's complaint—an important matter, when a busy man might otherwise have to wait over the week-end for his line to be put in order. The operator, the call office attendant even, frequently find themselves confronted with cases in which instructions must be supplemented with personal discretion. Every man in an office has on occasion found himself called upon to deal with the work of someone absent, of satisfying some enquirer on the telephone, of expediting instead of delaying the business of the public: these are opportunities which zeal and capacity will not neglect.

If it is not given to all men to possess the supreme gifts of character and intellect which Lord SELBORNE looks for: if they are loyal, if they are proficient, and if they have trained themselves to habits of independent thought, they are, we think, in a fair way to become ideal servants of their country.

### THE ANNUAL MEETING AND THE TELEPHONE SOCIETIES.

ALIKE in the papers read before the Annual Meeting of Officers and in the competitive papers read before telephone societies, now being adjudicated at Head Office, are to be found the most satisfactory evidences of the sound telephone theory and practice with which the staff of the Company is imbued. "It is perfectly remarkable," said Mr. GODDARD to the assembled officers, "in reading these papers to see the real, genuine, good telephone ideas which are being pumped into the staff by energetic men, who know their business, all over the country. When we think that these ideas are being disseminated throughout the whole staff it is most encouraging, and speaks in the highest degree of the energy and intelligence of the staff."

The telephone societies have amply justified themselves: as a means of promulgating the best and the standard practice of modern telephony they have been an unqualified success. In our art, as indeed in all arts, we have never finished learning; but that the staff as a whole is learning the right kind of thing in the right kind of way is especially satisfactory. In telephony there is much knowledge which can be acquired with great pains, but which is not practical; it is the right knowledge, the standard practice, which we are glad to see being apprehended and disseminated. By this we do not necessarily imply any limiting of the scope of knowledge, or slavish adherence to standards, but rather to emphasise the usefulness of harmony of action and the greater benefits which accrue from united effort. Nor do we by any means disparage those skilful engineers and telephone workers of the past whose education was developed before the days of telephone societies. *Vivere fortes ante Agamemnona.* There were always first-rate men in the past also; but what we consider matter for congratulation is the universal spread amongst the staff of admirable telephonic ideas.

### THE SIXTEENTH ANNUAL STAFF DINNER.

THE sixteenth annual dinner of the staff of the National Telephone Company was held at the Empire Rooms of the Trocadero Restaurant on June 23, Mr. Albert Anns, the Secretary of the Company, presiding. On his right was Dr. George Franklin, President, and on his left Lord Harris. Amongst the guests were Major W. A. J. O'Meara, Sir Albert Rollit, Mr. W. A. Smith, Sir Robert Hunter, Sir Alexander Kennedy, Mr. Edward Morten, K.C., Mr. T. A. Welton, Sir John Gavey, Mr. H. Laws Webb, Mr. G. F. Preston, Mr. T. C. Jenkin, Mr. J. E. Kingsbury, Mr. A. N. Bromley, Mr. H. H. Gaine, Mr. L. Stokes, Mr. J. F. Bond, Dr. M. Walmsley, Mr. W. M. Crowe, Mr. A. E. Pingree, Mr. C. A. Baker, Mr. J. Andrews, and Mr. H. S. J. Booth. Amongst the guests of individual members of the staff were Messrs. W. Aitken, P. P. Kipping, and F. A. S. Wormull (ex-members), G. Sutton, S. Thirkell, H. F. Anns, and G. F. Lee. The chief officers present included Mr. Frank Gill, Engineer-in-Chief; Mr. S. J. Goddard, General Superintendent; Mr. W. E. Hart, Solicitor; and Messrs. C. B. Clay, J. C. Chambers, A. Coleman, W. W. Cook, F. Cowley, R. A. Dalzell, E. Hare, C. J. Phillips, R. Shepherd, and F. Douglas Watson. The following members of the staff were also present:—Messrs. R. Aitken, F. Albany, W. Allen, V. Alsop, C. F. Ashby, J. Ashton, J. S. Atkinson, J. C. Bacon, F. G. C. Baldwin, W. Barnett, F. Barr, T. A. Bates, A. H. Baxter, R. W. Bell, R. C. Bennett, J. S. Best, G. E. Bewick, R. J. Blackwood, W. R. Bold, C. A. Bostock, J. W. Briggs, H. H. Broomhead, F. B. Brown, J. R. Brown, W. Brown, C. W. Bufton, E. S. Byng, J. W. Campion, C. W. L. Carter, H. Chambers, R. Chester, R. Clunan, B. S. Cohen, J. O. Cooper, H. G. Corner, A. E. Cotterell, R. F. Crow, W. Cullum, P. F. Currall, J. Darke, H. M. Darville, F. H. L. Davies, H. Davis, H. E. Deane, P. R. Denham, F. C. Disher, W. J. Downs, A. L. E. Drummond, F. P. Dumjahn, J. D. Duncan, P. Edmond, J. F. Edmonds, C. Elliott, H. Elliott, L. J. Farries, C. E. Fenton, S. S. Firth, T. Fletcher, A. A. Forrow, W. M. France, E. S. Francis, F. W. Francis, D. B. Fulton, J. R. Gall, W. E. Gauntlett, F. W. George, F. J. Gerrard, A. B. Gilbert, E. J. Gillett, G. Gillmore, W. Goulden, H. C. Gray, W. J. Gray, G. F. Greenham, W. H. Grinstead, R. Grosvenor, W. H. Gunston, W. S. Haines, A. C. Haley, J. W. Hambleton, T. E. Hanson, F. W. Hanson, A. H. Harris, F. C. Hawker, P. G. Head, S. F. Hill, F. G. Hives, F. Homfray, G. Hooper, W. Howe, C. Hughes, J. A. Hunt, R. W. Jackson, J. James, E. J. Jarrett, J. H. Jenkins, A. M. Kidd, F. G. A. Kiff, J. King, E. A. Laidlaw, A. R. Lamb, F. D. Latimer, O. G. Lee, J. Lemon, J. N. Lowe, L. H. Lowe, R. P. Lowe, S. Maber, A. G. Mackie, A. Maclean, G. A. Macdonald, H. G. McFarlane, H. J. Maclure, A. Magnall, A. Martin, D. McIntosh, J. Mewburn, W. J. Miller, S. Moody, C. F. Moorhouse, W. V. Morten, A. K. Murray, W. Napier, E. W. Newton, A. F. Paddon, W. Padget, J. R. Peacock, W. E. Pearson, A. Perkins, S. J. Pharo, H. Phillips, H. S. Plymen, S. H. Pook, J. Poole, H. W. Powell, P. H. C. Prentice, L. Price, E. L. Preston, T. A. Prout, A. Pugh, J. E. Pullen, C. G. Ransley, E. J. Rathbone, C. H. Redhead, A. Roberts, T. Rodger, A. E. Ruddeck, C. W. Salmon, N. A. Saltmarsh, J. Scott, J. Shea, G. M. Shepherd, F. W. Shorrocks, C. H. Sibley, F. E. Sims, E. C. Sleath, A. W. Smith, S. C. Smith, S. J. Smith, C. F. Spears, Hy. Starkie, O. W. Stevens, J. D. W. Stewart, J. Stirling, E. E. Stockens, J. H. Storrie, C. F. Street, D. Stuart, C. H. Summers, H. B. Sutcliffe, J. W. Swithinbank, C. E. Tattersall, J. T. Tattersall, W. Taylor, J. S. Terras, G. G. Tennant, H. S. Thompson, H. H. Thompson, J. E. Tinker, J. P. Urwin, W. A. Valentine, B. Waite, J. T. Walker, J. H. Wall, G. S. Wallace, A. S. Wallis, F. E. Waters, A. Watts, W. E. Weston, J. W. Wheeler, J. T. Whitelaw, R. H. Williams, E. Williamson, J. H. Wilson, C. S. Wolstenholme, J. Wrigley. The following newspapers were represented:—*The Times*, *Standard*, *Daily Telegraph*, *Daily News*, *Daily Mail*, *Electrician*, *Electrical Engineer*, *Electrical Review*, *Electrical Times*, and *Electrical Engineer*.

After the usual loyal toasts—with a feeling reference to the death of the late King Edward—had been proposed by the CHAIRMAN and duly honoured,

The CHAIRMAN, who was cheered on again rising, said: My Lord and Gentlemen, I am quite sure you will all join in my regrets that neither the Postmaster-General, the Assistant-



Postmaster-General nor the Secretary to the Post Office are able to be with us here to-night. Our disappointment is intensified because Sir Matthew Nathan had accepted your invitation and was hoping to be with us. Unfortunately, the Post Office estimates have been put down for discussion to-night, and it is imperative that Sir Matthew should be present in the House of Commons. I can only hope that on a future occasion we may be more fortunate. ("Hear, hear.") Gentlemen, the General Post Office is a marvellous organisation. I doubt if we quite realise when we drop a letter into a pillar box the wonderful machinery which is at once set in motion, and how, without any further trouble or effort on our part, that letter, if so desired, will be safely and swiftly carried and delivered to a friend at the other end of the world. We are justly proud of the British Post Office, and it is a real pleasure to have with us to-night so many distinguished representatives of that great department of the State. The last twelve months have been, like many years that have gone before, a period of hopes and disappointments. Last year when we met there were rumours and suggestions of an earlier settlement of the many difficulties which confront not only the National Telephone Company but also the Post Office, but during the last few months we have been actively engaged in preparing for the great fight which is apparently now inevitable. Some of our friends and guests of this evening, under the force of circumstances, will on that occasion be our adversaries. They are great fighters but they are fair fighters, and whoever comes out on top will, I hope, deserve the situation. (Laughter.) To give you some idea of the great task which is in front of you, I estimate that the cost to both parties before the purchase is finally settled will not be less than £100,000. When the National Telephone Company's staff is merged into that larger national staff of the General Post Office, the civil service will certainly be increased in quantity and I do not think it will be decreased in quality. We are now spending on the development of our business about half the amount that we were expending two years ago, but notwithstanding this, our revenue and our profits are progressing in the most satisfactory manner. The reason for this is that during this year and next year we shall be reaping golden harvests from the seed which has been sown in the past. The prospects from the shareholders' point of view are very bright, but I do not think they are quite so brilliant from the point of view of the staff. The reduction in the capital expenditure of course means less employment, and although efforts, and successful efforts, have been made to provide other work for our construction staff yet it has resulted in many hundreds of our men having to seek employment elsewhere. We were very sorry to lose them and we wish them the best of good luck in the future. The saying that competition always ends in combination is, perhaps, more true of the telephone business than any other, and although competition still flickers and smoulders at Hull and Portsmouth, it cannot be very long now before, in the words of Sir W. S. Gilbert, it will be extinguished by the hose of common sense. (Laughter.) Last year I ventured to put a value on our undertaking as a business proposition, and it was a pleasant surprise afterwards to be told that I had been too modest in my estimate. I do not think I will try again, as perhaps next time I may overdo it. (Laughter.) But of this I am quite sure, that when the curtain is rung down on the final scene of our operations, and the amount to be paid for our business has been ascertained, it will be found, viewed from the standpoint of the benefits which pass to our successors—for we are going to hand over to them more than 500,000 stations with a revenue of between £3,500,000 and £4,000,000 a year—to be a transaction unique in the commercial history of this or any other country. ("Hear, hear.") As you know, the dead assets—the poles, wires, switchboards, instruments and so forth—are to be scheduled and valued, but the live assets—the brains and the energy and the devotion which have created this wonderful business, and which to-day give it life and being—are not to be valued. I call these latter assets, and I use the word with its double meaning, priceless assets. I know that many of you are worried and very unhappy about your future prospects as servants of the State, and I know also how very sincerely the President and the other members of the Board have regretted that they have not been able to give you those assurances, those full assurances, that would make you as happy and contented as you

deserve to be. I still hope and believe that all will be well with us in the end, and that we shall have "a happy issue out of all our afflictions." I should like to say a word or two about the Staff Transfer Association. First of all I wish to congratulate it on the good work it has already done. I understand the one burning and outstanding question is the claim which has been made by the association on behalf of the staff that service with the Company should be counted for the purpose of pension and other things as service with the State. ("Hear, hear.") May I venture to express the hope that our future masters will consider that a very reasonable request, and that they will in their wisdom remove the last barrier which, I think, remains between you and your future happiness and prosperity. It means so little to the State; it means so much to the staff. I will now ask you to drink to the continued prosperity of "The National Telephone Company," and I couple with that toast the name of one who has been, and always will be, a true friend of the staff, our esteemed President, Mr. George Franklin. (Cheers.)

The toast was drunk with great cordiality.

Mr. FRANKLIN, who was given a very cordial reception on rising to respond, said: Mr. Chairman, Lord Harris and Gentlemen, for many years it has been the custom at the staff dinner of the National Telephone Company to toast "Success to the Company," and its Board of Directors. For several years it has been my good fortune to respond for the Company and its Board. It is difficult to express in new thoughts our appreciation of the kind hospitality extended to the Directors, but we may certainly say that all that is uttered on these occasions with regard to the Company and its Board is indicative of the most harmonious relations existing between the Directors and the staff of the Company. (Cheers.) Our Chairman to-night referred to his speech of a year ago, and he told us that he considered the last year had been one of both hopes and fears. Well, with regard to the hopes, they may still come to fruition; with regard to the fears, they may still come to nought. A year ago our Chairman did, as he says, greatly daring, venture on an estimate of the value of the business as a going concern. Whatever may be the result of these estimates, I think, at all events, we can put them on one side for the present and congratulate ourselves that we meet to-night on one of those most interesting occasions, when the board and the staff can assemble as friends and discuss high politics or low politics or no politics at all. At all events we can discuss those things that are of vital importance to the mutual interests of the staff and the Company. ("Hear, hear.") At the present time there is one thought upon which the minds of both the staff and the board and also of the shareholders are concentrated. That is what the Scotch divine would call "our latter end." (Laughter.) By that I mean the transfer to the State. This transfer to the State involves considerations of the highest importance as well as the utmost delicacy, and just as in the past the Company has been able to count upon the loyalty and devotion of a united staff, I venture to think that the Company may still count upon the loyal co-operation of a united staff until the transfer to the Post Office takes place. (Cheers.) Those who show the greatest loyalty to the Company will also show to the Post Office how loyal they can be to their new masters. I venture to think that the same loyalty which has been extended to the Company will when the transfer takes place be given to the Post Office also. I believe that the Post Office will find that amongst the Company's priceless assets, as our Chairman described them—I would rather call them quick assets—will be that loyalty and energy and ability of the staff which has made the telephone enterprise what it is to-day. ("Hear, hear.") When the Post Office takes over the 17,711 servants of the National Telephone Company it will find in them its most important asset. The Chairman has also spoken of the development of our enterprise. During the past year we have added 32,153 stations, and we now have a total of 516,888 stations. We have 1,569 exchanges, or fourteen more than a year ago, while the total number of messages transmitted over the wires of the Company during the past year has been 1,362 millions, being an increase of 39 millions over the previous year, the cost per message amounting to only .51d. We often find that comparisons are made between the telephone industry here and the telephone industry in Europe and in the United States. We all know that the United States is the Mecca

of telephone enterprise. They have shown there what can be done with an enterprise like ours when it is unhampered by State control or State supervision and enjoys a free flow of capital and fair play. Great Britain has one telephone for every 77 of the population, Germany has one for every 71, France one for every 202, Italy one for every 625 and Spain one for every 955 of the population. When one thinks of those men and women who have made this telephone enterprise what it is, it is with some reluctance that we look forward to the time when the conditions may be different. There never was a time when the telephone staff of the Company was as highly organised, as efficiently managed as it is to-day. Both the operating staff and the technical staff are showing month by month what they can do, and they are bringing the organisation to a very high pitch of excellence. I say that deliberately to the staff, because I think it is due to them for their efforts which are made month by month both in London and in the provinces. It is due to them that I should express the cordial appreciation which the Board of Directors have of the zeal, the enterprise, the industry which they have shown, and which has made this great business what it is. (Cheers.) I have referred to the development of the Company. When we remember that we are within a year and a half of the expiry of the licence I think it says much for the public spirit of the Company to find it still catering for the needs of the public by putting on over 30,000 subscribers, and spending money for that purpose, in the course of the year. I can imagine that companies with less public spirit and with a less high ideal might be content with a much more meagre performance; but the Board of this Company have determined deliberately that their policy shall be to maintain the plant and the enterprise as far as possible at concert pitch until the moment comes for the transfer of the undertaking to the State. (Cheers.) It will require great judgment and great consideration, but I want to say at once, on behalf of the Company, that it will indulge in no churlish spirit, but will cordially join hands with the Post Office to arrive at a satisfactory solution of the problems before them, and, by hearty co-operation on both sides, I venture to think, after all, it may be found that justice is done alike to the staff and to the shareholders of this Company. (Cheers.) I want to say here and now, in case I have not already said it, that the Board of Directors appreciate very much the spirit which lies behind the performance of the duties of the staff, and I hope you will accept that assurance as being the sincere and unanimous view of my colleagues on the Board. (Cheers.)

Mr. C. B. CLAY: Mr. Chairman, my Lord, and Gentlemen, I am called upon to propose the toast of "Our Guests." It is one which it is easy to do, because I know the enthusiastic reception which it will receive. I may remind you that this being a staff dinner, our Directors are on this occasion our guests. We have with us our President (Mr. Franklin), Lord Harris, Mr. Smith, and Sir Albert Rollit. (Cheers.) We regret the absence of the other Directors, which in more than one case is due, I am afraid, to ill-health. We wish them a speedy recovery, and certainly hope to see them with us next year. ("Hear, hear.") We have here many friends from the Post Office—Sir Robert Hunter, Major O'Meara, and, I think I may still say, Sir John Gavey. (Cheers.) We have also an old member of our staff whom we are always delighted to see, Mr. Preston. (Cheers.) While mentioning old members, may I say that last night I saw Mr. Sinclair, and he greatly regrets that he is unable to be present. We have also among us many representatives of the legal and engineering professions, as well as a host of other friends. We have Mr. Morten, and we have with us, I am glad to say, this time Sir Alexander Kennedy. We have tried to get him on previous occasions, but unsuccessfully. We are glad to see him to-night, and we hope that this will not be the last time. ("Hear, hear.") We have also with us a gentleman who is also known to many of you, Mr. Leonard Stokes. (Cheers.) When a company or anybody else makes a choice it is always very pleasant to find that choice is endorsed from the highest possible quarters. The Company chose Mr. Stokes as one of their architects, and the Royal Institute of British Architects has chosen him as their President. (Cheers.) At our Metropolitan staff dinner Mr. Edmonds, who was speaking on that occasion, suggested continuing our annual dinners after the fateful time when we are taken over by the Post Office. He said that we should continue

these dinners so long as there was any staff left to attend them. (Laughter.) I think we might very well adopt that suggestion, and as Mr. Edmonds somewhat humorously said, continue the dinners until ancient accountants, enfeebled engineers, cunning contract officers, tired traffic managers, melancholy maintenance, stricken storekeepers, superannuated superintendents and doleful Directors are all that remain of the old brigade—that the dinners should go on as long as they were able to come either on crutches or in bath chairs. (Laughter.) Supposing that that is adopted, we should then have the pleasure for many years, I hope, of still entertaining our guests of to-night. Gentlemen, I give you the toast of "Our Guests," and I couple with it the names of Sir Albert Rollit, who is well known to us all, and of Sir Robert Hunter. (Cheers.) I am told that Sir Robert Hunter very rarely loses a case, but if he does he takes it to the House of Lords, and there you are. (Laughter.) I wish to add that I have a letter from Mr. Ogilvie. The Chairman has explained to you that Sir Matthew Nathan is unable to be present on account of the Post Office estimates. Mr. Ogilvie is absent for the same reason. He writes: "I very much regret to miss the opportunity of meeting the staff of the National Telephone Company, with so many of whom I have been so long and so pleasantly associated, though I am looking forward with pleasurable anticipation to a still closer association in the future. With my best wishes that you may have a pleasant and successful evening." I have also a telegram from Mr. Norway, who was to have been with us: "Greatly regret domestic illness prevents attendance to-night."

The toast was very cordially received.

Sir ALBERT ROLLIT: Mr. Chairman, Mr. President, Lord Harris and Gentlemen, immediately I entered the room to-night I was served with this document (the toast list) by my august friend, the toast-master, which makes me appear as a co-respondent with my friend, Sir Robert Hunter, to this toast. (Laughter.) That was sufficiently disconcerting at a time when a certain Commission is sitting, but my fears were increased when the Chairman spoke of a curtain being rung down, disclosing we know not what, and of £100,000 of costs to be paid. The only relief and comfort I have heard since is, in the words of the last speaker, that Sir Robert Hunter always carries his cases to the House of Lords and always wins them. (Laughter.) As a co-respondent with Sir Robert Hunter, and if we are cast in £100,000 damages, I hope that the House of Lords will at least continue to exist, if only for that particular purpose. (Laughter.) Now, I have to thank my friend, Colonel Clay, for the very kind manner in which he referred to the Directors. We have always tried to continue on good terms with all those with whom we are associated in this enterprise, and it is pleasant to hear from the lips of one so representative of the staff as Colonel Clay of the reciprocity that exists towards us in that respect. But I must confess I thought he treated his Directors rather as what I may call "Clay pigeons"—(laughter)—when he spoke of doleful Directors and Directors in bath chairs. (Laughter.) Well, I have not come to that yet, for, if I am getting into the old age of youth, I am still in the youth of old age—"Hear, hear"—and if I may speak for my colleagues, dolefulness will only be in the last act and not yet. We hope that curtain will not be rung down yet, and that we shall still have the privilege of representing this Company for some time to come. ("Hear, hear.") Now, in one respect the association of my friend, Sir Robert Hunter, with myself to respond to this toast of "The Guests" is at any rate suitable, because coming events cast their shadows before, and you are really speeding the parting and welcoming the coming guest. As the parting guest, and one sorry to think of the time of parting, I thank you most heartily, and I am quite sure that when the coming guests arrive they will be typically represented by my friend Sir Robert Hunter, not only with his universal success in the House of Lords and everywhere, but, what is still more important, with kindness and regard for others in every path of life and also with a fair and frank interest in and consideration of the rights of those who have served the community so well and are going, I hope, in many cases also to serve the State. (Cheers.) May I again express to Mr. Anns and the staff the obligation of any Board to those who serve them as we have been served. I remember in my Greek history there was a critical moment, I think at Salamis, when the



staff of the Greek general came to him and said: "We are outnumbered by the Persians; we must retreat." He answered: "Outnumbered? How do you make that out? How many have you put me down for?" Well, our staff contains many men who are makers of generals, and those are the men who are wanted to command the allegiance of industry in this modern world of industrial competition, and our President, who presides over us so ably, will be the first to acknowledge, with his co-Directors, that it is the staff which in a very large degree have not only made him equal to the exacting work which he has had to conduct, but have executed that work with despatch and with credit and honour and advantage to the Company and the commercial community. Now, though dying gladiators as we may be, and though as such we salute all those surrounding us in the arena of our work, I think we may all be proud of having belonged to the National Telephone Company. (Cheers.) The Company may pass away but that pride will remain. We have been pioneers of speedy communication in the world. Here, we take our part first in the history of that speedier communication, and let me say there is no personal friendship of which I am more proud than that of having had the privilege of intimate acquaintance with my friend Graham Bell, one of the greatest scientists who ever lived, who gave me the second pair of telephones which came to England. (Cheers.) The National Telephone Company has developed that speedy communication which, to quote a lady who spoke to me yesterday, may be expressed in three degrees of comparison—telegraph, telephone, and tell-a-woman. (Laughter.) By that I understood—you laugh, you take it, I think, satirically—no doubt she meant tell a National Telephone girl if you want the extreme of speed in communication—(laughter)—and, rendering their services as they do, I confess my sympathies are very frequently with them. ("Hear, hear.") Not unnaturally, when they hear cursory remarks addressed to them they use Telephones English sometimes—(laughter)—and I do not defer it, but at any rate they, like the staff, have served us well, and I hope that they too will not be forgotten under any new arrangements in 1912. (Hear, hear.) Ours is a great organisation, gentlemen, and why is it a great organisation? Because we have always, and not merely on these convivial occasions, as a Company and a staff pulled together. ("Hear, hear.") We have never been at cross purposes. We have never been like those two cross-eyed, squinting people who met in the middle of a busy street and collided. One said to the other, "I wish you would look where you're going," and the other said "I wish you would go where you're looking." (Laughter.) On the contrary, we have co-operated in every possible way, and we have been dealing with a great invention, perhaps the greatest of all modern inventions. Oh, no, I do not think the greatest because I was recently spending a horticultural day, and I heard there of apparently an even greater invention than the telephone. The head of the Agricultural Department at Washington was telling us—to use his own words: "We have made more, I think, in our country, of intensive cultivation than you have done here or even in France. We have discovered how to make an arid, dry, unfertile plot of land become irrigated by automatic means, and the way we have done it is this—we have planted onions and potatoes in alternate rows, and the onions have grown so strongly that they have drawn tears from the eyes of the potatoes, and have raised the level of saturation of the whole surrounding district." (Laughter.) I do not think we can surpass that. But there is one way, I am sure, in which we surpass everybody, and that is in the hospitality which you have extended to us to-night and on so many previous occasions. There has been no spirit of parsimony or parsnips about it, nothing niggardly like the feeling of the gentleman who went to engage apartments in a boarding-house. When the terms had been arranged, he said, "Well, but you must make some allowance, because I am a vegetarian." "Oh," said the landlady, "then you are one of those, I suppose, as I have heard of—what they call herbaceous boarders. We do not take them at any price." (Laughter.) Now I conclude by saying that this hospitality has, I hope, never been abused by myself or anyone here, and never will be, greatly as we have enjoyed it. Two Scotsmen had been dining, even as well as we have been dining to-night, when one said to the other, "Now, Saundie, we must part." We have heard a great deal about parting to-night, and

they had to part. "Be careful, Saundie, how you go down the steps, for they're steep, and be careful how you tread the garden path, for it's slippery, and when you get to the gate you will see two cabs. Tak' the first of them, for the other won't be there." (Laughter.) Well, I hope that the hospitality you are kind enough to extend to us will always be appreciated, as it is, in the spirit in which it is given, and on behalf of your Guests, especially the Directors of the National Telephone Company, I return you our most hearty thanks, with a feeling of that gratitude which is the memory of the heart. (Cheers.)

Sir ROBERT HUNTER: Mr. Chairman, Mr. President, Lord Harris and Gentlemen, in rising to return thanks for your guests, and particularly for your guests of the Post Office, I desire to repeat the regrets which were expressed by your Chairman at the absence to-night, owing to the exigencies of Parliamentary business, of both the Postmaster-General and the Secretary to the Post Office, either of whom would have responded to this toast with a weight of authority and a felicity of expression to which I can lay no claim. My qualification for representing the guests from the Post Office is one upon which it has become painful for me to reflect. It is sometimes said unkindly that when ladies reach a certain age they prefer that their age should be considered uncertain. That is rather the stage at which I have reached in my relations to the Post Office. There is a story—I have no doubt it is one of Sir Albert Robt's—(laughter) of a man in the Army, who was continually returning his age as 30. At last the authorities remonstrated and said, "There must be some mistake. You have been 30 for five years." He said, "I am very sorry, but I cannot help it. I have a sister who is one year younger than I am. She is always 29, and I cannot run away and leave her." (Laughter.) Well, gentlemen, that is my feeling now. I am rather tired of doing simple addition sums in relation to my age, and I should like to choose a good round figure, say 50, and stick to it.

There is, however, one advantage which age possesses, and I think it is about the only one. It is that it has many memories. Some of them, no doubt, are sad, but I think—at least, I hope—that most of them are pleasant. Amongst my pleasant memories are those of dinners of this kind. My mind reverts to prehistoric days when I had the honour of attending these gatherings, before that break in our social intercourse which was brought about by the fancy of a member of a bygone Government—I am glad to remember it was a Unionist Government—who thought that to eat your bread and drink your wine once a year would have such a corrupting influence on the servants of the Post Office that they would neglect their public duties. (Laughter.) Well, gentlemen, it is foolish for any man to boast of his virtue, but last year I had the pleasure of sitting next to Mr. Smith, one of your Directors, and he gave me most glowing accounts of the wonderful matches they were inventing at Bryant & May's. I should like to mention for his guidance and yours, that even if he undertakes to supply me with the best kind of matches, those you strike on the wrist-band, for the rest of my natural life, free of charge, it will not induce me to connive at the reduction by a single penny of the purchase money of this undertaking. (Laughter.)

Gentlemen, amongst my memories of those prehistoric days is the memory of that genial railway magnate, Mr. James Staats Forbes. I negotiated with him. I dined with him, I heard him give evidence before a Select Committee, and I am at a loss to say in which capacity I admired him most. It seems to me he made only one mistake in his public life. When the amalgamation of the Chatham Railway and the South-Eastern Railway took place, as was his due, an annuity was granted to him, and he had the power to commute it. He did so, and died almost directly afterwards. If he had been satisfied with the annuity, no doubt we should have had him with us still. Another memory which comes to me from those prehistoric days is that of your late Manager, Mr. Gaine. During the whole time of his connection with your Company I had occasion to see him constantly upon important and delicate business, and the more I saw of him the greater was my admiration for his abilities and character, and my regard for him as a man, so that when the sad news of his sudden premature death came, I can assure you that I felt it as a personal loss. ("Hear, hear.")



Now I will leave prehistoric memories and come to a recent incident. At your last dinner your Chairman, Mr. Anns, said he had a presentiment that that dinner would be the last, and your President, Mr. Franklin, premised that on the next occasion Sir Henry Babington Smith might be in the chair. I have never believed in presentiments, and my scepticism has been confirmed. The curious thing is, that the only difference between this gathering and last year's is that our friend Sir H. Babington Smith has left us, and on thinking it over I have just hit on the real reason why he has left us. Sir H. Babington Smith gained a great reputation by reason of his dealings with States and companies over wireless telegraphy. After that he had many interviews with your President, Mr. Franklin, and they culminated in one very solemn secret interview to which no one else was allowed access. Well, I am convinced that Sir H. Babington Smith learned at those interviews that he could make nothing out of Mr. Franklin, and that he was destined to undergo a crushing diplomatic defeat if he remained at the Post Office. (Laughter.) He therefore looked out for any employment outside the service which might present itself, and he is now living on the shores of the Bosphorus in comparative poverty, but in the enjoyment of a well-earned repose after six years' hard labour at the Post Office. (Laughter.)

Gentlemen, it is not for me to say why Mr. Anns' prophecy has not been fulfilled, and I am certainly not going to prophesy myself to night. But one thing is certain, that before long you, the gentlemen of the staff of the National Telephone Company, will become directly the servants of the State: and when that event occurs I need hardly say you will receive a most cordial welcome at the hands of your colleagues already in the service. ("Hear, hear.") From that time there will be nothing but a friendly rivalry in efficiency and in zeal for the promotion of the interests of the public. (Cheers.) Gentlemen, I will go further. I do not see that I need consider that fellow-service as postponed. That fellow-service between the servants of the Post Office and the servants of the Telephone Company already exists, and it has existed for nearly 30 years. For nearly 30 years you have conducted a great and most important branch of the telegraph service. A means of communication which is within the monopoly of the Postmaster-General has been conducted and developed by you. You have not only conducted that system of telephonic communication; you have developed and adapted it in the interests of the public. You have familiarised the public of this country with a most ingenious and beautiful invention, an invention which enables men to hear the voices of their fellow-men over a distance of many hundred miles and to speak with one another as though face to face in the same room, an invention which has profoundly affected social life and which has given a great impetus to economic progress. On the last occasion of my visit to one of the great exchanges I was filled with admiration and wonder, so delicate is the adjustment, so fine the apparatus, which is necessary to enable that commonplace everyday occurrence of a conversation between A and B to take place. When one reflects that the force which actuates that delicate mechanism is the same force which dazzles our eyes with the lightning flash and rolls and reverberates through the heavens in the thunderclap, it seems to me that telephonic communication represents one of the most marvellous instances of the subjugation of the forces of Nature to the service of man. Gentlemen, the tale is not yet told. I daresay many of you were present last night, as I was, at the lecture which Sir John Gavey gave at the Institute of Civil Engineers. That lecture reduced my spirits to the lowest point, for it made me realise how profoundly ignorant I was upon matters with which I have in a certain sense some concern. But the particular point of that lecture to which I wish to refer was this. While Sir John Gavey dwelt on the great progress made by telephonic art during the last 30 years, he also indicated that a gigantic step in advance was likely soon to be made. We are soon to have, he told us, an automatic exchange. The ladies in the exchange room are to be relieved from the maddening task of responding to impatient subscribers. Each subscriber will sit in his own chair by his own table, and by simply moving some apparatus will put himself in communication with his neighbour, and will do all that delicate work which is at present done in the exchange room. Well, gentlemen, our expert friends must tell us whether these arrangements

are practicable, but their mere suggestion shows that telephonic invention is not yet at an end, and that momentous developments are in the air and are still to be expected. Mr. Chairman, there are those who profess a doubt as to whether these great discoveries add to the sum of human happiness or the development of human individuals. I confess I have never been quite able to share in the sincerity of this doubt. I believe every increase in the power of man over Nature enables happier, fuller lives to be lived by a greater proportion of men and women; and in particular I believe that anything which facilitates intercourse not only conduces to the better realisation of the material resources of Nature, but also tends to make life happier, to dissipate superstition, to dispel prejudices and to enhance good feeling between different classes, different nations and different races of mankind. ("Hear, hear.") You, gentlemen, have been engaged in developing and promoting a new and most wonderful means of communication, and you are entitled to cherish the proud thought that by your exertions you have materially advanced the civilisation of the world. (Cheers.)

MR. A. E. RUDDOCK: Mr. Chairman, my Lord, and Gentlemen, I do not intend at this late hour to disregard the old adage in regard to brevity, and on this occasion, if for the first time in my life, I am going to be short. (Laughter.) We have gathered here from all parts of the country, and before I come to the actual toast I have to propose I should like to give you a series of epigrams I heard the other day describing the characteristics of the different nationalities. We have men here from every corner of England, Scotland, Wales and Ireland, from every remote hamlet it might almost be said, and it may be a help to our friends of the Post Office to know the characteristics they have to look for in the men likely to be taken over at the end of next year. It was the Bishop of Liverpool who, when asked to distinguish the characteristics of the different four nations of which we are composed said: "An Englishman dearly loves his Bible . . . and his beer; a Scotsman keeps the Sabbath and everything else he can lay his hands on; a Welshman prays on his knees on Sunday . . . and on his neighbours every other day in the week; an Irishman never knows what he wants—and he will not be happy till he gets it." (Laughter.) Gentlemen, this toast should be an easy one. It is bound to be received with enthusiasm, and yet I feel a certain difficulty in proposing it in proper terms. It is very difficult to express in adequate terms our appreciation of Mr. Anns without appearing fulsome, or perhaps what might be worse, raising the demon of jealousy in the hearts of his colleagues. I often think that it is a great pity we cannot be brought into more close personal touch with our chiefs. Mr. Anns' abilities are evident to all of us: his calligraphy is very well known—once a month it is very welcome. (Laughter and cheers.) But, gentlemen, it is not these qualities which has made him what he is to us all. It is his high character, his personality, the absolute assurance that every one of us has in his fairness—(cheers)—the fact that there is no suspicion of favouritism of any kind. It is these which have made Mr. Anns what he is to us. There is an element of pathos about our proceedings at this time. We have had many pleasant functions, business and pleasure, and though they may continue, and probably will under the State—at least I hope so—I think most of us will miss the old Company and we shall regret that the days have gone when we were working under it. But I can assure Mr. Anns that whether he remains and takes an active part in telephone matters in the future or transfers his activity to other spheres, we shall one and all remember with esteem and affection his connection with us. I give, you, gentlemen, the health of our Chairman. (Cheers.)

The toast was received with enthusiasm, the whole company rising and singing "For he's a jolly good fellow."

THE CHAIRMAN: Mr. Ruddock, my Lord and Gentlemen, I thank you very heartily for the way in which this toast has been proposed and received. If I were to dwell too much on the very complimentary remarks which have fallen from Mr. Ruddock's lips I am afraid I might become so conceited that my friends would never recognise me. I thank you all very sincerely.

The proceedings shortly afterwards terminated.

## TELEPHONE CURRENTS.\*

PROFESSOR PERRY'S paper is another instance of the interest which is now being taken in matters telephonic, and is heartily to be welcomed on that account.

The paper gives formulæ to determine the effect of inserting any kind of apparatus in series with or in shunt across the line. Mathematical accuracy is not claimed, but the formulæ are said to be sufficiently accurate for practical purposes.

The first half of the paper deals with uniform lines of infinite length, and has not been abstracted here, since the formulæ given are the ordinary ones which have been frequently published before. The only difference lies in the different nomenclature adopted and the somewhat modified arrangement of terms.

The second half deals with the insertion of what Professor Perry calls "contrivances." These may be any arrangements of apparatus whatever. It is much to be regretted that in this important part of the paper no indication is given as to how the formulæ are derived, nor what assumptions have been made. Throughout the paper the lines have been assumed of infinite length and no terminal apparatus allowed for.

In the following abstract the nomenclature has been modified to conform with that in use by the National Telephone Company.

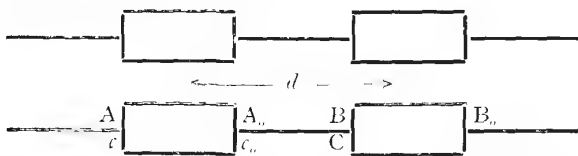
The line constants are:—

Resistance per mile...	...	...	R ohms.
Inductance " " " "	...	...	L henries.
Capacity " " " "	...	...	K Farads.
Leakance " " " "	...	...	S Mhos.

Frequency " " " "	...	...	$\frac{p}{2\pi}$
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## DETACHED CONTRIVANCES.

Consider a circuit as shown below.



Let  $c$ ,  $c_1$  and  $C$  be the currents at A, A', and B respectively, and  $v_1$ ,  $v_2$  and  $V$  the corresponding voltages.

At corresponding points of the "contrivances," viz., A and B, we have

$$\frac{V}{C} = \frac{v_1}{c} = \rho, \text{ say,}$$

$$\text{Then } V = v_1 \cosh Pd + \frac{R + L p j}{P} \sinh Pd$$

$$\text{and } C = c_1 \cosh Pd + \frac{P}{R + L p j} \sinh Pd$$

$$\text{where } P = \sqrt{(R + L p j)(S + K p j)}$$

For any kind of contrivance

$$\frac{V}{C} = \frac{\theta + \phi \rho}{a + b \rho}$$

where  $\theta$ ,  $\phi$ ,  $a$  and  $b$  are given in value: they are usually vector quantities.

Solving for  $\rho$  and finding  $C$ , two results will be obtained, viz.,  $C_1$  and  $C_2$ .

$$\text{Generally } C_1 C_2 = 1$$

Therefore if  $\frac{1}{2}(\theta + \phi)$  is called  $Q$

$$C = Q + \sqrt{Q^2 - 1}$$

*Example.*—Let the contrivance be a resistance  $r_1$  (or its equivalent) in series with each line and a shunt resistance  $r_3$  between their mid points.

Then if  $c$  is taken equal to 1

$$c_1 = 1 + \frac{r_1}{r_3} + \frac{\rho}{r_3}$$

$$\text{and } v_1 = 2 r_1 + \frac{r_1^2}{r_3} + \rho \left(1 + \frac{r_1}{r_3}\right)$$

from this it follows that

$$Q = \left(1 + \frac{r_1}{r_3}\right) \cosh Pd + \frac{1}{r_1} \frac{P}{R} \left(1 + \frac{r_1}{2 r_3}\right) + \frac{1}{2 r_3} \frac{R}{P} \sinh Pd$$

Take the case of a cable with the following constants:—

R =	18	ohms per mile
K =	0.055	mfd. "
S =	0	
L =	0	
p =	5,000	

$$\text{Then } P = \sqrt{R K p j} = 0.07036 \quad 45$$

$$\frac{P}{R} = 0.003909 \quad 45$$

$$\frac{R}{P} = 255.8 / 45$$

Let the contrivances be spaced 4.263 miles apart and each consist of an inductive leak  $L = 1388$ , i.e., 0.5925 henry per mile.

Hence  $r_3 = L p j = 693.7 j$   
 $r_1$  is a condenser of capacity  $K = 0.206$  mfd. corresponding to 0.878 mfd. per mile.

$$\therefore r_1 = \frac{1}{K p j} = -971.13 j$$

$$\cosh Pd = 1.0007 \quad 2.35'$$

$$\text{and } \sinh Pd = 0.29994 / 45.5'$$

Substituting these values of  $r_1$  and  $r_3$  it is found that

$$Q = 0.05384 - 0.068078 j \text{ from which}$$

$$C = 1.057 / 183.54 \text{ or } 0.946 / 183.54$$

Since  $c = 1$  there is an attenuation of 5.5 per cent. in 4.263 miles, or 1.3 per cent. per mile.

*Tuning a Circuit for One Frequency.*—This may be done by placing condensers in the line and an inductive shunt across it, as in the case just considered.

Given any particular value of  $d$ ,  $r_1$  and  $r_3$  must be so chosen that  $C$ , as evaluated above, becomes equal to

$$1.0$$

If  $d = 1$  mile the figures are  $K' = 0.5917$  mfd. and  $L = 0.8324$  henry.

If  $d = 2.755$  then  $K = 0.2273$  and  $L = 0.3692$ , both for a frequency of 800 ~.

*Isolated Contrivances.*—When  $d$  is very large  $\cosh Pd = \sinh Pd$

$$\text{If } p = 5,000$$

$$R = 88 \text{ ohms}$$

$$K = 0.05 \times 10^{-6} \text{ fds.}$$

$$\text{Then } \frac{v_1}{c} = \rho = \sqrt{\frac{R}{K p j}}$$

$$= 593 / 45$$

$$= 419.3 (1 - j)$$

$$= \theta - \theta j$$

$$= \theta - \phi p j \text{ say.}$$

If an inductance  $L$  be inserted at the middle of this line the best result is given by

$$L = \frac{\theta}{p} = \phi = 0.11725$$

This multiplies the received current by 1.414 and causes a loss of 45°.

\* Abstract of a paper read by Professor Perry before the Physical Society Feb. 25, 1910.

An inductance of  $L = 0.11725$  in series with the line and a leak consisting of a capacity  $\frac{1}{f^2}$ , i.e., 0.532 mfd. causes the received current to be multiplied by 1.414 and to get a lead  $225^\circ$ .

#### DISCUSSION.

Major O'Meara gave some figures regarding experiments which had been made to determine whether the formulæ usually given for loaded cables were applicable to gutta percha covered cables. These experiments, which were undertaken before deciding on the new loaded Anglo-French cable, gave the following results:—

The cable experimented on was 40 lbs. per mile covered with 50 lbs. of G.P. per mile.

$$K = 0.13 \text{ mfd.}$$

$$R = 44 \text{ ohms.}$$

The calculated attenuation constant with these figures was found to be 0.0427 per mile, whereas the experimental constant was found to be 0.0419.

The figures for the Anglo-French loaded cable are as follows:—

$$R = 12.5 \text{ ohms per mile.}$$

$$\text{Weight} = 160 \text{ lbs. per mile.}$$

$$\text{Insulation} = 300 \text{ lbs. G.P. per mile.}$$

$$K = 0.12 \text{ mfd.}$$

$$R \text{ of coils} = 6 \text{ ohms at } 750 \text{ } \sim \text{.}$$

$$L \text{ of coils} = 0.1 \text{ henry } \sim \text{.}$$

$$\text{Coil spacing} = 1 \text{ nautical mile.}$$

$$\text{Measured attenuation constant, } 0.0140 \text{ per mile, loaded.}$$

$$\text{Calculated } \sim \text{, } \sim \text{, } 0.0147 \text{ } \sim \text{, } \sim \text{.}$$

$$\sim \text{, } \sim \text{, } 0.045 \text{ } \sim \text{, } \sim \text{, } \text{unloaded.}$$

Major O'Meara also pointed out the great importance played by leakance when lines were loaded.

Mr. A. W. Martin also laid stress upon the part played by leakance, pointing out that it is not the actual value of the leakance which is important, but the ratio of  $S$  to  $K$ . He showed a number of curves giving the equated lengths of various loaded lines both for iron-cored loading coils and also for air-cored coils. The latter are found to be inferior to the iron on account of their higher effective resistance per henry. A circuit tuned to any special frequency would be useless for telephonic purposes, but might be useful for telegraphy.

Experimental results show that coil loading by the Pupin method might give improvements of 370 per cent. The quality of speech becomes bad when the number of coils per wave length at 2,000  $\sim$  is less than  $\pi$ .

The maximum improvement due to uniform loading by iron wire wrappings round the conductors was stated to be 100 per cent., and for wires of 2 sq. mm. and more, 60 per cent.

Mr. B. S. Cohen stated that it was a mistake to assume that tuning a circuit to the average telephonic frequency would be of advantage. He had shown previously that an average speech wave consisted of a fundamental of from 100 to 300  $\sim$  and harmonics of importance up to the eleventh. Tuning would therefore be absolutely harmful. He quoted some figures worked out by Mr. G. M. Shepherd to illustrate this. In a particular case the variation of attenuation for the cable without contrivances was 300 per cent. as the value of  $p$  was increased from 1,000 to 9,000. Using Professor Perry's formula and adding 0.593 henry per mile as a shunt and 0.44 mfd. per mile in series, the variation of attenuation is 500 per cent. as  $p$  increases from 1,000 to 5,000. For  $p = 5,550$  the attenuation becomes 0, that is to say, the contrivance acts as an infinitely low resistance shunt. For values of  $p$  greater than 5,550 the attenuation constant becomes negative, but the physical meaning of this is not clear. Compared with this increase in distortion due to the addition of contrivances the effect of loading by Pupin coils is to reduce the distortion.

Dr. Russell compared the author's solution for the case of zero leakance with Heaviside's solution for the distortionless circuit and stated that the attenuation was twice as great for the latter. It was very satisfactory that the behaviour of loading coils could be so accurately predicted.

Dr. J. A. Fleming (in a written communication) referred to the neat and convenient solutions obtained by the use of hyperbolic functions, and gave several formulæ for uniform lines. He stated that results

calculated for a frequency of 800  $\sim$  enabled the effects of actual speech to be fairly accurately predicted. Dr. Fleming complained that the author did not make any reference to G. A. Campbell's paper on loaded lines, and which discusses a similar problem. The formula given by Campbell for the propagation constant  $P$  of a non-uniform loaded line in terms of the same line unloaded is as follows:—

$$\cosh Pd = \cosh Pd + \frac{Z'}{2Z_0} \sinh Pd$$

Where  $d$  is the coil spacing

$Z$  the coil impedance

$Z_0$  the unloaded line impedance.

This formula, however, is of doubtful accuracy when  $d$  is greater than one-eighth of the wave length of the loaded line.

Figures were also given to show the accuracy of the formulæ for uniform lines. In a certain case the calculated ratio of sending to receiving current was found to be 5.36, whereas from measurements made by the National Telephone Company the actual ratio was 5.3.

Mr. G. M. Shepherd (in a written communication) stated that the author's method of compensation was similar to Thompson's "compensated" line. Such a line is equivalent to a uniform line of which the constants are:

$$L = L - \frac{2}{p^2 K d} (p^2 J_0 L + R_0 R)$$

$$R = R - \frac{2}{K d} \left( \frac{L_0 R - L R_0}{p^2 L_0^2 + R_0^2} \right)$$

$R_0$  and  $L_0$  are the constants of the inductive leaks. The rule governing the space is virtually the same as that for loading coils. The difference between the two systems is that one is tuned and the other not. The great variation of  $a$  with frequency given by this formula is shown in the following table for a cable of 18 ohms and 0.055 mfd. with 0.972 henry per mile leaks:—

$\sim$	$a$
1,035	0.0189
1,115	0.0284
1,430	0.0487

It is evident from these figures that this method of compensation is not workable, and the only commercial solution so far advanced is loading with series inductance coils on the Pupin system.

Professor Perry, in reply (communicated), after thanking Major O'Meara and Mr. Martin for the results of the loading of Post Office cables, stated that his paper had been misunderstood. He was not advocating the use of inductive leaks and condensers, but simply used them to illustrate his formulæ, which can be applied to any sort of contrivance. The chief claim is to have given a formula which can be used by non-mathematical people.

#### CORRESPONDENCE.

##### Re SUBSCRIBERS' APPARATUS CARDS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to my letter in the April issue and to Mr. Randell's comments in the June issue, I refrained from replying thereto in the hope that other members of the staff might perhaps express their views.

I quite agree with Mr. Sherburn, as it is obvious that records cannot be efficient until they have been properly checked. The point which I wished to make is the necessity for extreme accuracy in the cards, as they are now the only official record of the subscribers' apparatus. Where the whole of the subscribers' instruments and switchboards in large towns have been changed, possibly by temporary staff, there is a danger that inaccuracies may have crept in, and the simple form used in this district gives a means of ensuring the accuracy of the cards without additional expense. Both the records used by the above-mentioned gentlemen are very useful.

Nottingham, July 19.

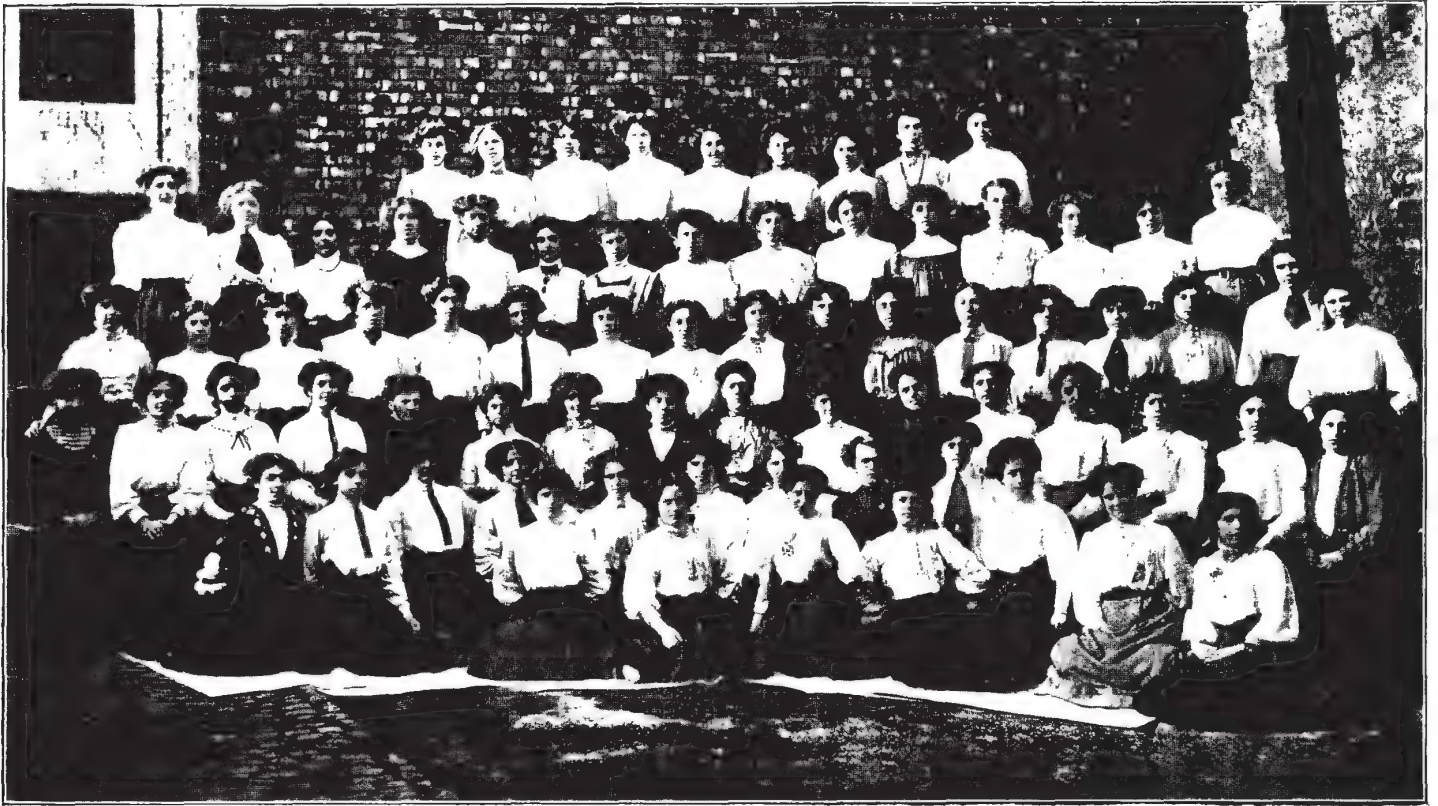
P. R. COCKREM.

##### CORRESPONDENCE CLASS BOOKS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REGARDING the above I should like to suggest that, in view of the transfer of the Company's business to the Post Office and probable stoppage of these classes either this year or next, the Telephony Papers "A," "B," "C" and "D" should be bound into one volume and sold to members of the staff. I think a large number would avail themselves of the opportunity of getting in a





THE NEWCASTLE-ON-TYNE OPERATORS' TELEPHONE SOCIETY.

permanent form information which is not to be found in any text books. Although most of the staff have already got these books it must be borne in mind that a great number have the earlier issues which are out of date.

Hoping this will be considered by the Correspondence Class Committee.  
Glasgow, June 24. A. S. DUNLAN.

#### EDINBURGH CLASSES

The following are the results of the past winter's work of members of the Edinburgh district staff:—

##### *At Heriot-Watt College.*

Practice of Commerce: Certificate, Edgar J. Fraser.  
English: Medallist and prizeman, William Wilson; certificate, Wm. Hislop.  
Commercial German: Certificate, Thos. Crawford.  
Telephony: Medallists, J. A. Douglas and Robt. Goodfellow; certificates, Wm. Doig, John Wilson, Geo. Colquhoun, John McConnell, Thos. Cutt, Hugh Kilgannon, Peter Gilmour, Richard Clark, Wm. Knox, R. G. Richardson, John Robson, Michael McKenna and John Lockwood.  
Telegraphy (honours): Certificates, David Christian and John G. Hare.  
Telegraphy (ordinary): Certificates, Hugh Kilgannon and R. G. Richardson.  
Wireless Telegraphy: Certificate, David Christian.  
Special Class (calculus for Engineers): Certificate, David Christian.  
Elementary Electricity and Magnetism: Certificates, Robt. Goodfellow, John McConnell, Arch. Pagan, Robt. M. Henderson, Jas. Waugh, Chas. Arthur, William Doig, Hugh Kilgannon and Thos. Cutt.  
Hygiene: Certificate, Alex. McNab.  
Physiology (senior): Certificate, Alex. McNab.

##### *At Evening Continuation Classes.*

Shorthand (speed 80 words): Miss M. M. Munro.  
English: Certificate, Chas. Stewart.  
Elocution: Certificate, Chas. Stewart.  
Business Procedure: Certificate, Jas. Campbell.

##### *At Leith Technical College.*

Electrical Engineering (honours): Certificate, J. P. Melville.  
Elementary Electrical Engineering: Certificate, John G. Hare and John McEwan Brown.  
Electricity and Magnetism: Certificate, John G. Hare and John McEwan Brown.

#### PRESENTATION AT THE GENERAL POST OFFICE.

In the Deputation Room at the General Post Office on June 29, the Right Hon. Herbert Samuel, M.P. (the Postmaster General), presented the prizes in respect of the essay competition in connection with the course of lectures on telephony, delivered by Mr. D. H. Kennedy (of the General Post Office) at the Regent Street Polytechnic during last winter. The essay was limited to 5,000 words, with not more than 25 illustrations. The prizes in the form of cheques had been offered by Mr. A. M. J. Ogilvie, one of the Assistant Secretaries to the Post Office.

Besides the Postmaster-General, there were present Sir Matthew Nathan, G.C.M.G. (Secretary to the Post Office), Mr. S. J. Goddard (General Superintendent of the Company), Sir Robert Hunter, C.B. (Solicitor, P.O.), Mr. F. Gill (Engineer-in-Chief, Company), Major W. A. J. O'Meara, C.M.G. (Engineer-in-Chief, P.O.), Mr. Ogilvie, Mr. C. B. Clay (Metropolitan Superintendent), Mr. G. F. Preston, Mr. Phillips, Mr. Lowe and others.

The first prize was awarded to Mr. E. W. Pettitt of the Engineer-in-Chief's Office, G.P.O., and the second and third went to Messrs. H. G. Bishop and P. Prentice of the Engineer-in-Chief's Office of the Company.

An interesting point in connection with these awards was the closeness in the number of marks obtained by the successful three, only eight marks separating first and third. It was explained that the competitor placed third had been handicapped by a restricted interpretation of the conditions as to the number of drawings, and this, in view of the closeness in marking, had special significance.

Although the prizes, as originally announced, were three in number, two additional ones had been provided, one of these for competitors unconnected with any technical department, and the other for lady competitors. The first went to Mr. S. A. Paterson of the Secretary's Office, G.P.O., and the second to Miss Mary Phillips (daughter of Mr. C. J. Phillips), of the Post Office Telephone Service.

In the short speeches made by Mr. Samuel and Mr. Ogilvie, both dwelt on the need for, and the value of, technical education, and, in passing, Mr. Ogilvie paid a tribute to the Company for the work it has done in promoting technical knowledge among its staff.

## LONDON NOTES.

THERE are four wedding presentations to be noted. Mr. A. Hough and Mr. T. Hack of the Cashiers' Department, were presented with a case of cutlery and a clock respectively. Mr. A. J. Gardner, Chief Inspector, Hop, was presented with a set of cutlery. Miss Bloomfield, Typist in the Divisional Engineer's office, Paddington, was presented with an electro-plate jug.

THE following extract from the *London Gazette* will be of interest to the staff: "*General Reserve of Officers.*—Honorary Captain Charles Noel French, late Captain the Lancashire Royal Garrison Artillery, to be Captain." Mr. French is at present a Contract Officer in the Southern division. He served in the Army as an Honorary Captain during the South African war.

INSPECTOR F. E. ROBERTS, North-East district, recently won second prize for a twelve hours' walk at Stamford Bridge. The walk was under the auspices of the Middlesex Walking Club. Not only did Mr. Roberts secure second place, his distance being 50 miles, 1,716 yards, but he beat the previous world's record by over two miles.

A VERY enjoyable picnic, promoted by the staff's Hospital Saturday Fund Committee, took place at Hampton Court on July 9. Threatening weather early in the week rather militated against the sale of tickets. The holiday season also affected the attendance, as many of the staff were away or preparing to go. The party, although small, had a delightful time. An exploration of the rooms of the palace, with their fine sculpture, decorated ceilings, and historical associations, to say nothing of the splendid collection of pictures and tapestry, whiled away very pleasantly the time before tea. Afterwards the gardens, the maze, and the river filled up the afternoon and evening.

THE Traffic staff held a meeting on July 11, and elected the officers of the operators' society for next session. The arrangement of last year that the society should be worked as a branch of the London Telephone Society will not be continued, as it has been thought advisable to carry on the two bodies quite independently. It is hoped that the new arrangement will work quite satisfactorily, and that there will be an even larger membership than last year. It was decided not to have a lady chairman, owing, it is understood, to the difficulties of organisation and management which might be anticipated during the first year of the new régime. The reason given does not strike one as very adequate, particularly in view of the businesslike manner in which Miss Minter fulfilled the chairman's duties last year. Mr. Edmonds was elected chairman, with Miss Reekie and Mr. A. E. Abbott as vice-chairmen. There is also a strong committee of 25 members. Altogether, a successful future ought to be in store for the society.

IN the City and Guilds Examination, the results of which have just been published, Mr. G. Smith, City Fitting Department, has secured first-class honours in telephony, and Mr. T. M. Inman, Exchange Electrician, Battersea, first-class honours in telegraphy. In the second-class honours list there are fourteen passes amongst the Metropolitan staff, as against nine last year.

AT the London Division Territorial sports, Mr. G. Roden, Divisional Fitter, Gerrard, won third prize in the cycle race. Mr. Roden is in the Electrical Engineers.

THE call office collectors had their second annual outing on July 6. The morning was spent at Brighton, the sea front proving the strongest attraction. After lunch at the "St. James' Hotel," a drive was enjoyed to Portslade, *via* Shoreham and Southwick. On returning to Brighton in the evening, tea was partaken of, the day's enjoyment ending most happily with songs and music. There was an absence of sun, but as the rain also kept away, the weather conditions might have been worse.

## NEWS OF THE STAFF.

Miss E. G. NETTLETON, Wakefield Exchange, has been promoted from operator to be Clerk-in-Charge at this exchange, replacing Miss Moore, resigned.

Mr. W. D. SCOTT, Leeds, has been promoted from Chief Inspector to be Electrician.

Mr. T. PARKER, of Leeds, has been promoted from Inspector to be Chief Inspector.

Miss EDITH WATSON, Leeds Central, has been promoted from Senior Operator to be Supervisor.

Miss JULIAN MARY HUGHES, Senior Operator, Royal Exchange, Liverpool, resigned on April 13 to take up another appointment. She was presented by her colleagues on leaving with a wrist watch and handbag.

Mr. JOHN RODGERSON BLACK, who resigned from the Company's service at Edinburgh recently, was presented with a silver cigarette case by his friends in the Edinburgh staff.

Miss ELIZABETH S. PRATT, Operator at Edinburgh Central, has resigned from the service.

Mr. F. JOHNSON, Local Office Clerk, Southport, resigned the service on April 21 to take up an appointment in Montreal, Canada, under the Bell Telephone Company. He was presented on his resigning with a dressing case and travelling rug by Mr. Chambers, the District Manager, who expressed his regret that Johnson was leaving, and voiced the best wishes of the staff for his future welfare and prosperity. A dinner was given him in the evening, which 45 members of the staff attended.

Miss H. MORRICE, Operator at Aberdeen Central Exchange, has been promoted to be Supervisor.

Mr. J. RILEY, Sub-Engineer, Swansea, has been promoted to be Local Manager, Neath.

Miss ELIZABETH ANN THOMPSON, Chief Operator, Neath, has been promoted to be Supervisor, Swansea.

Miss ELSIE BURTON, Operator, Cardiff, has been transferred to Newcastle-under-Lyne Exchange in the Hanley district. Prior to her leaving Cardiff, she was presented by her colleagues with a gold signet ring as a mark of their esteem and with best wishes for her future welfare.

Miss M. E. EVANS, recently transferred from Cardiff to Penarth as Clerk-in-Charge, was presented by her colleagues with a salad bowl, jam spoon, and butter knife, with best wishes for her success in the new position.

Mr. HERBERT S. BROWN, Stores Clerk, Birmingham district office, has been transferred, in a similar capacity, to Nottingham district office, to take the place of Mr. GEORGE H. CARRIER transferred to the Birmingham district office in the position of Stores Clerk.

Miss FLORENCE AGNES MANNING has been promoted from Senior Operator to Supervisor at Bristol Exchange.

Miss M. SKIPWORTH, Senior Typist, Nottingham district office, on resigning from the Company's service, was presented with a gold brooch.

Miss ETHEL MINNIE SEDGWICK, Assistant Typist, Nottingham district office, has resigned the Company's service.

Miss FLORENCE MARY BARKER, Monitor, Nottingham Central Exchange, has resigned the Company's service.

Miss MABEL HOOLEY, Supervisor, Nottingham Central Exchange, has been transferred to the position of Monitor.

Miss ADA DRAKE, Operator, Nottingham Central Exchange, has been promoted to be Supervisor.

Contract Officer E. H. LAKE, Derby, was presented with a Swan fountain pen on the occasion of his transfer to Lincoln. The Local Manager, on behalf of the Derby staff, wished him success in his new sphere of work.

Miss EDITH BARKER, Journal Clerk, Fees Department, Manchester, on resigning her position with the Company on July 23 to join her relatives in Canada, was presented by the members of the district office staff with a silver-backed hair brush and comb.

Miss F. M. HAVELOCK, of Bank Exchange, Liverpool, on her transfer to a London Exchange in consequence of the removal of her parents from Liverpool, was presented by her colleagues at Liverpool with a brush and comb as a mark of their esteem and good wishes.

## METROPOLITAN STAFF CHANGES.

Mr. W. M. CLARKE, Storekeeper, Battersea, to be Call Office Collector, Salisbury House.

Miss M. G. RISE, Operator, London Wall, transferred to the Rentals Department as Clerk.

Miss W. M. DOERR, Operator, Kensington, transferred to the Rentals Department as Clerk.

Miss MINNIE F. BUTLER, Clerk-in-Charge, North, promoted to be Clerk-in-Charge, Kensington.

Miss ADA KNAPMAN, Clerk-in-Charge, Brixton, promoted to be Clerk-in-Charge, North.

Miss CELIA HOOPER, Senior Supervisor-in-Charge, Hammersmith, promoted to be Clerk-in-Charge, Brixton.

Miss EMMA STEVENS, Supervisor, Hop, transferred as Supervisor to Gerrard.

Miss CATHERINE MCKENZIE, Operator, Bank, promoted to be Supervisor-in-Charge, Romford.

Miss ANNIE GIBBONS, Operator, Hop, promoted to be Supervisor-in-Charge, Richmond.

Miss EDITH KING, Operator, Avenue, promoted to be Supervisor, Hop.

Miss MABEL ROBINSON, Operator, Gerrard, promoted to be Supervisor, Paddington.

Miss ROSINA GIFFORD, Operator, Dalston, promoted to be Supervisor, North.

## MARRIAGES.

Miss EVA BARTLETT, Supervisor, Southampton Exchange, was the recipient of a dinner service and other gifts from the operating, local, contract and district office staffs on her resignation to be married, the presentation being made by the District Manager.

Mr. A. W. G. HEWITT, Rentals Department, Manchester, was presented with a fumed oak hallstand by the members of the clerical staff on the occasion of his marriage with Miss EDITH GERTRUDE EVANS, late Senior Operator, Royal Exchange, Liverpool, whose wedding present from her colleagues took the form of cutlery.

Miss ELIZABETH R. TURNER and Miss MABEL G. WESTON, Senior Operators at Stoke Bishop and Kingswood Exchanges respectively, who recently left to be married, were each presented by their colleagues with a case of silver spoons as a mark of esteem.

Fitter E. LEAVESLEY, Nottingham, was presented by his colleagues with a clock on the occasion of his marriage.

Miss EDITH GERTRUDE EVANS, Senior Operator, Royal Exchange, Liverpool, resigned on June 9 to get married, her wedding present from the staff taking the form of cutlery.

Mr. J. BELL, Exchange Electrician, Liverpool, was on the occasion of his marriage presented by his colleagues with a very handsome mahogany clock. The presentation was made by Mr. Hill, D.M.E.

Mr. W. BALL, Test Clerk, Central Exchange, Liverpool, was presented on the occasion of his marriage with a clock subscribed for by his colleagues on the electrical staff, as a token of the esteem in which he was held by them.

Miss KATE E. MOORE, Chief Operator at Wakefield Exchange, left the Company's service on June 16 to be married. She has been in the Company's

service since 1900, commencing at Dewsbury Exchange. She was presented with a dinner and tea service as a mark of esteem from the staff at Dewsbury and Wakefield.

Miss NELLIE BEAUMONT, Operator, Dewsbury, was presented with a set of silver salt cellars by the staff at Dewsbury on the occasion of her leaving the Company's service to be married.

Miss MARY BROWNHILL, Leeds Central, was, on the occasion of her leaving to get married, presented by the operating staff with a silver lamp and sugar tongs. She entered the Company's service in April, 1896, was made Teaching Supervisor in August, 1906, and Supervisor on June 14, 1907.

Miss E. L. HUTLEY, General Superintendent's office (Correspondence Department), left the Company's service on June 30 in view of her approaching marriage. Her colleagues in the Typewriting Department presented her with dinner and tea service. She was also presented with a breakfast service by Mr. Rolt of Southern Provincial Superintendent's office.

Miss HILDA SHARP, Operator, Leeds, was presented with a silver flower stand on the occasion of her leaving to get married.

Miss LUCY J. PEACOCK, Operator, Roundhay Exchange, Leeds, left the service on June 9 to be married, and was presented by the staff with a clock.

Miss F. PRITCHARD, Operator, Central Exchange, Swansea, who recently resigned to be married, was, on leaving, presented by the Swansea operating staff with an handsome *epagne* as a mark of esteem.

Miss PRUDENCE MILES, Night Operator, Central Exchange, Birmingham, resigned the service to be married on June 2 after three and a half years' service. The day staff at the Central Exchange presented her with a dinner service, and the night staff with a cruet.

Miss CECILIE ELIZABETH DEANS JOHNSTONE, Clerk-in-Charge at Folkestone, left the Company's service on June 30 in view of her approaching marriage. She was presented on behalf of the staff with an oak salad bowl and salt cellars as a mark of esteem and with best wishes for her future welfare.

Miss M. WILSON, Supervisor, Aberdeen Central Exchange, was on the occasion of her leaving the service to be married, presented by the Clerk-in-Charge, on behalf of the operating staff, with a china tea set as a token of esteem and regard.

#### London Traffic Department.

Miss AMY KNAPP, Supervisor, North, on leaving to be married, was presented with a silver cake basket by the staff.

Miss BEATRICE IZATT, Operator at Croydon, on resigning to be married, was given a pair of handsome Karanchi vases by the exchange staff.

Miss AMY WATTS, Supervisor, Gerrard, on leaving the service, was presented by the supervising staff with a silver-backed brush and comb, and by the operators in her division with a gold brooch.

Miss ANNIE ALTON and Miss DAISY WEATHERLEY, on leaving Gerrard Exchange to be married, were each presented with a tea service, and Miss DAISY AGLEY, resigning for the same reason, with a dinner service.

Miss BESSIE CHAKLTON, Supervisor, Battersea, on being transferred in a similar capacity to Kensington, was presented by the operating staff at the former exchange with a gold bangle.

Miss DOROTHY PITT, on leaving Brixton Exchange to be married, was presented with a Wedgwood biscuit box.

Miss HILDA PEACOCK, of Richmond Exchange, on leaving to be married, was given a handsome eider down quilt by her friends at that exchange.

Miss MARGARET BANKS, on leaving East Exchange to be married, was presented with a glass trinket set from the operating staff, and several personal gifts from colleagues.

#### OBITUARY.

We regret to record the death of Foreman C. E. BYRNE, Manchester district, who met with a fatal accident on June 21. Foreman Byrne had gone up a 50-foot pole to speak to one of his wiremen, when by some means he slipped and fell on to a wooden fence, sustaining a compound fracture of the thigh and severe internal injuries. Previous to the interment, which took place at Macclesfield Cemetery on June 25, a funeral service was held at King Edward's Chapel, Macclesfield, of which he had been a member for a number of years. Floral tributes were sent from the various departments in Manchester, and also from the Stockport and Macclesfield staffs, the staffs mentioned also being represented at the funeral.

We regret to report the death of Mr. HARRY DICKSON, Inspector, Southport, which occurred on March 19, and express our deep sympathy with his widow. Mr. Dickson had been in the service both in Dublin and Southport a good many years.

It is with regret that we have to record the death of E. STANTON, Linesman, Leeds, who died on June 30. A wreath was sent as a token of respect by the staff. The deceased was a member of the Territorial Forces, and had served in the South African war. He held the following:—One South African medal with four clasps, including Transvaal, Cape Colony, Orange Free State and Ladysmith. He was buried with military honours.

We also regret to record the death of J. SMITH, Wireman, Norwich, at the age of 63. He was an old and valued servant of the Company.

#### STAFF GATHERINGS AND SPORTS.

**Swansea.**—The annual outing of the engineering and line staff took place on July 9, when a party numbering over 50 spent an enjoyable day at Ilfracombe. The trip was made by steamer across the Bristol Channel, the weather being excellently fine and, with one exception, the terrors of *mal-de-mer* were absent. Shortly after arrival the party sat down to an excellent lunch, after which the majority drove to Woolacombe, where sports were held. A number of well-contested events resulted in prizes being won by Messrs. G. Thomas, S. Anderson, M. Evans, J. Washer, E. W. Thomas, F. Stevens, W. Williams, G. Chick and C. Price. Tea was taken after arrival back in Ilfracombe, and after the

prizes had been distributed, the party embarked at 8 p.m. for home. The success of the outing is due in a large measure to the efforts of Mr. W. King, who acted as secretary.

**Leeds.**—On July 2 a very enjoyable outing to Knaresbro' was arranged under the auspices of the Leeds Telephone Society. A party of 50 left Leeds Station at 1.55 p.m., arriving at Knaresbro' about 3 p.m. Tea was ordered for five o'clock at Ellerkers' Café, and the intervening period was spent by the majority of the party on the river. After tea the various historical spots were visited, and more boating indulged in. After an exceedingly pleasant afternoon, the tired but happy party returned to Leeds, arriving at 10.30 p.m. Miss Fotherby, Messrs. Niemann and Corlett were responsible for the arrangements, and carried them out in an admirable manner.

**Weybridge.**—This centre had its annual summer outing on July 2. The party included the Local Manager (Mr. A. A. Forrow) the Chief Clerk (Mr. C. S. Weston) and other members of the Guildford and Aldershot staffs. They embarked at Shepperton Ferry in the steam launch *The Princess*, with the idea of getting to Windsor, but the captain refused to pass the dangerous spot known as the "Hells of Ousley," and it was subsequently attacked on foot in skirmishing order. Tea was taken on board, and a piano, songs, and the presence of the ladies contributed to an enjoyable trip, in spite of the tearful attitude of Jupiter Pluvius.

**Coventry.**—The staff of this centre held their annual outing on July 9, when a drive was taken by four-in-hand to Hampton-in-Arden. A most enjoyable time was spent. After being photographed, the party, which consisted of about 50 members, partook of a meat tea at the "Engine Hotel." Sports were indulged in, and a novel cricket match played. The return to Coventry was made about 9.45 p.m. The guests included amongst others, Mr. and Mrs. J. Scott (Asst. Prov. Supt.), Mr. and Mrs. Jno. Mewburn (District Manager), and Mr. and Mrs. R. S. Grosvenor (Local Manager).

**Head Office.**—A walking match in ordinary attire took place on July 9 between Messrs. Hardstone and Payne of the Test and Buildings Department, Head Office, respectively. The distance was ten and a half miles (Westminster to South Croydon). Mr. Payne covered this distance in 1 hour 53 minutes, Mr. Hardstone following on in 1 hour 59 minutes 30 seconds, Mr. Payne covering six and a half miles in the first hour. It is possible that another match may be arranged.

**Edinburgh.**—A number of the staff at Edinburgh enjoyed a ramble on the evening of June 22. Starting from the Braid Hills, the route taken was by Fairmilehead, Kaim, Greenend, and Liberton.

The staff at Edinburgh held another ramble on July 9. Train was taken to Colinton, whence the party of 70 walked to the reservoirs at Glencorse. Here tea was taken picnic fashion, and games engaged in before continuing the walk to the Braid Hills.

**Wolverhampton.**—On June 18 the switchroom staff journeyed by charabanc to the old town of Bridgnorth. An enjoyable tea was taken, and after visiting the various historical spots the return journey completed a glorious afternoon. The arrangements were in the hands of Miss Wylde, the Clerk-in-Charge, to whom thanks are due for the successful outing.

**Brighton.**—On July 2 a party of the Sussex staff journeyed from Brighton to Arundel for a half-day's outing, where they were met by another party from the Chichester centre. The combined parties, numbering 52, sat down to an excellent tea at the "Bridge Hotel." In the absence of the District Manager, Mr. H. Hatton (Electrician) presided, other officials present being Messrs F. Frost (Traffic Manager), H. Drury (District Office), A. C. Tucker (Chief Contract Officer) and Miss Trott (Clerk-in-Charge of the Brighton Exchange). Mr. C. F. Moorhouse (District Manager) together with Mr. F. W. Roberts (Brighton Manager) and Mr. A. W. Faro (Chichester Manager) arrived later in the afternoon and accompanied the party home by the last train. After tea most of the party indulged in boating, and the park and other attractions of the place were patronised, everybody thoroughly enjoying themselves. The arrangements for the outing were very efficiently carried out by Mr. H. Drury.

**Gloucester.**—The district annual picnic took place on June 18, when a large number of the staff and friends journeyed by brake from their various centres to Framilode, a village picturesquely situated on the Severn. After an early tea various games and amusements were indulged in, including cricket, boating and dancing. Altogether a most enjoyable time was spent. Ideal weather added to the pleasure of everyone. Mr. Harry Thompson (hon. secretary) and his committee are to be congratulated on the result of their efforts. Mr. Elliott (District Manager) and Mrs. Elliott were present, and took a prominent part in the day's proceedings. During the afternoon, after numerous attempts to induce the gathering to assume an unnatural gravity for so festive an occasion, the group was successfully photographed by the Company's "official photographer."

**Leeds.**—On June 18 a match took place under the auspices of the Staff Cricket Club, between the married men and the single. The match was very keenly contested, but the married men with the calm confidence, due to maturer years, easily defeated the single men, the result being as follows:—Married, 47. Single, 41. There was a large attendance of the staff.

**Dewsbury.**—On July 2 about 30 members of the staff at Dewsbury had a very enjoyable outing. The drive to Cawthorne in charabancs, a distance of fourteen miles, was very enjoyable, and upon arrival there tea was taken at the "Spencer Arms." Afterwards the whole party went into the park, in which there are numerous attractions. A visit was also paid to the Museum. The Assistant Engineer, Mr. Halmshaw, who includes photography amongst his hobbies, took several photographs of the party, which turned out very effective.

**Southampton.**—A very pleasant afternoon was spent by the Instrument and Line Departments on July 9 on the occasion of their annual outing. The party journeyed by brake to Hamble, where they partook of a crab tea. In a cricket match which followed the Instrument Department were victors over the Line staff by 68 runs, the brothers Naylor and H. Newman, for the winners, being conspicuous for their batting and bowling respectively.



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## TELEPHONE MEN.

### LII.—ALFRED BRAUN GILBERT.

ALFRED BRAUN GILBERT was born at Erdington, Birmingham, in 1873, and educated at King Edward VI Grammar School, Birmingham. In the January of this year he completed twenty years' service, having entered it at Birmingham in 1890, under Mr. Alfred Coleman, who was then the General Manager for the Midland counties. In that city the Company had a workshop, where apprentices were first trained and all classes of work undertaken; switchboards for small exchanges were constructed and additions to existing switchboards in the Midland counties were carried out by the shop mechanics. Apprentices had, in addition, experience of switchboard maintenance, and afterwards received training in the Instrument Department.

In 1892, Mr. Gilbert was transferred to the Coventry centre as Inspector, and had all round experience, taking his share in the opening of several new exchanges and in the building of trunk routes.

In 1895 he was transferred back to Birmingham as Service Inspector for that district. That was in the days when Birmingham embraced what now is three districts, when single circuits were the order of the day, and when operating supervision was hardly thought of. Everything that should not happen did happen from the subscriber's point of view; and nothing happened that should not happen from the operator's point of view, and it was no easy task to adjust matters.

Mr. Gilbert was temporarily placed in charge of the Coventry centre for a short time twelve months later. During that period he had the experience of opening a new exchange at Nuneaton in the morning, and finding on his return to the exchange after lunch that most of the working indicators and other apparatus had been fused by a violent thunderstorm which visited the district in the interval.

When Coventry became the headquarters of the then new South Midland district he was appointed Local Manager at Derby for the Derby and Burton-on-Trent centre under Mr. W. W. Cook, the Nottingham District Manager.

After a stay of three years Mr. Gilbert was appointed Local Manager at Nottingham, Mr. E. Williamson then being District Manager. Here he assisted in a big scheme of metallic circuiting the single lines, extending the underground system, opening new premises, and changing over from the magneto system.

In 1902 he was appointed District Manager for the new district of Exeter, which had been formed out of the Plymouth district, serving first under the superintendence of Mr. R. Shepherd, and later of Mr. R. A. Dalzell. Mr. Gilbert received further promotion in 1906, when he was appointed Chief Engineer for the Glasgow district, where many plans have been drafted and re-drafted to meet the many altered circumstances which Glasgow has been subjected to during the last few years.

The difficult conditions under which telephonic affairs in Glasgow have had to be conducted have entailed an exceptional amount of work on the part of the staff, and in all this work Mr. Gilbert has contributed a full share, bringing to bear on it the scientific spirit which he commended to the telephone society in a paper published in this JOURNAL in May, 1908.

Mr. Gilbert has taken very great interest in all educational and social matters in Glasgow, and was chairman of the Glasgow and West of Scotland

Telephone Society for the session 1909-10.

Whilst in the south gardening was his chief recreation, but in the north Mr. Gilbert says he finds photography more interesting than golf.



## SOME TRAFFIC STUDIES.\*

By PERCY SANSOME, *Leicester.*

## SUPERVISORS AND THEIR WORK.

It will generally be agreed that you cannot overestimate the importance of the supervisor, who is directly responsible to the clerk-in-charge for the conduct and discipline of the operators in her sections and for the service they are giving. You might call her the moving spirit of good service. Supervisors should be expert operators themselves, assiduous and, above all, enthusiastic with it. One thing the Operating Department should bear in mind is, "without enthusiasm the service can never reach a high standard of efficiency."

Team work as a whole should be strictly encouraged by the supervisor, and in the case of a rush of calls (which is by no means a rare occurrence), she should help them to clear. The operator looks to her for guidance and assistance, and when irregularities appear, she should show the operator her faults at once, and the remedy to be applied.

Supervision should pay for itself. There is no need for supervision if it does not result in improvements, and therefore increased profits. An interesting point crops up here, that is, how many operators should a supervisor control? I do not know if the Company have any standard number.

## TEAM WORKING.

There is no doubt about the importance of this. If a good service is to be given, team working should be strictly encouraged and adhered to.

There are two methods of team working:—

First, the whole operating staff working as one team; and secondly, what might be called "sectional teams," that is to say, so many operators working as a team under the charge of a supervisor. They both have their advantages, but a diversity of opinion exists as to which is the best.

Personally, as regards team work, I have not the slightest hesitation in saying that it should be done on the whole and not in sections. I fail to see where a gain can be obtained in having branches of co-operation: and this is what sectional teams mean. As an analogy, take the case of a war; each battalion is in some way a support of another, and the same principle applies to exchange operating.

It is an operator's duty to endeavour to get as many calls through as possible, and this is what she should live up to, giving help and receiving help ungrudgingly.

Reverting to sectional teams, the only good argument in favour of separate teams is that it instils a spirit of competition among the operators, and also tends to cause the speed of answering to be slightly quicker, owing to the keen competition among the teams. But I may say that any figure of merit obtained would yield only a qualified result and engender endless discussion, which more often than not causes bad feeling. Further, I fail to see how anyone with our existing plant could possibly get a correct average of separate divisions.

## 1a.—Whole Team Working.

A B C D E F G H I J K L M N O  
X Y Z

## 1b.—Sectional Teams.

A B C D E F G H I J K L M N O  
X Y Z

FIG. 1.

In Fig. 1, 1a represents "whole team working" and 1b "sectional team working." The advantage of whole team working is obvious.

1b is divided into three separate divisions, denoted by X, Y and Z, in charge of one supervisor for each division. It will be seen that if the speed of answer is slightly improved the effect will be more than neutralised by the fact that operators E and F and J and K are working in direct opposition to one another, showing that the

method is wrong in principle. In my opinion there is nothing to warrant divisions working against each other.

This is a very difficult matter to explain clearly, and I will reduce the argument to this. It is said that with "sectional teams" and competition among operators a quicker service is given. It is also known that with whole-team work a quicker service is given, and in face of this latter assertion some advocate making points in the board, represented by E F and J K, where no team work must take place. It may be argued that the gain through competition is greater than the loss sustained on points E F and J K; therefore you must increase the scale of competition by decreasing the size of the competitive divisions, or, in other words, you are driven to separate operating.

Another disadvantage of competitive divisions is that on cohesion exists among supervisors.

We will suppose that supervisor A is attending to a subscriber on E and completes the details of the call; but if supervisor B is at J, and is also wanted at F, supervisor A would not do anything with F. But why? If she did it would tend to damage her division's figures.

The personal element, not only as regards the operators, but more particularly as regards the subscriber, comes into play, and I consider it is unfair for any division to be compared until the subscribers' element is eliminated.

Then comes an interesting question. What is the best way to arrange operators to obtain the quickest service with efficiency? Personally I consider a good arrangement is to put a slow girl between two sharp ones, getting an arrangement like this:—(S indicates sharp, L indicates slow) S, L, S, L, S, L, and so on. This will show how wholesale team work operates—the slower operators are all covered by the sharper ones. But in any system of "sectional team working" this facility is lost.

I have from time to time noticed that operators have a strong tendency to answer subscribers on their own position first, irrespective of the order of calling. Preference in this way should not be given, as it is bound to cause undue delays, and upset any observation figures that might be being taken; the order of calling, to obtain a uniform speed of answer (and that is just what is required), should be rigidly impressed.

Team work is one of the principal factors of giving good service, and to be absolutely effective should extend the whole length of the switchboard. There should not be any points even where it ceases or diminishes, except, of course, where it cannot be avoided, such as at the dead ends, when the load should be somewhat below the average to compensate for limitation of team work at these positions.

## SERVICE OBSERVATION.

This system is frequently described as the ways and means of checking the operators.

The particulars that can be obtained from this source at the end of the month are very interesting, and provide a means whereby the quality of the service can be expounded. Both the speed of answer from operator is obtained, also that of the subscriber, which is a matter that I shall refer to later. The accuracy of the connection, and numerous other items, so that with details supplied, the supervisors and others can see the results of their own work.

It may not be clear to many present in what manner the tests are handled. The chief apparatus is a headgear receiver, ordinary two-way plug and cord, and a "chronograph stop watch" with split seconds.

Only one call at a time should be observed, whether that call lasts for 30 seconds or 30 minutes or even more. The call is timed step by step and entered in the columns marked. Take for instance an outgoing call. Immediately the subscriber rings, he energises the indicator on the observation board, the same time as at the switchboard, the watch is immediately started. When the operator answers, the time is entered, the same when the subscriber answers, also the time the conversation finishes, and last the time from ring off to the operator taking the plug out and disconnecting.

When an incoming call is received, the indicator drops and same manner of timing is gone through.

In working out the speed of answer, the average is considered, together with the percentage of calls answered within a given time, say, two, three, four, five, ten, twenty seconds.

\* Extracts from a paper read before the Leicester Telephone Society.

A good average may appear, yet, contain a number of calls answered in 25 to 35 or more seconds, the average being kept down by a large proportion of calls answered in two, three, or four seconds. But this is not so satisfactory as when a three to five seconds' answer consistently is given, with no very slow answers, and operators should bear these remarks in mind, as a few very slow answers cripple the averages. Irregularities are denoted by a stroke in the appropriate column, of which there are some twelve for operators' irregularities, and six for subscribers'; provision is also made for recording cases in which the call is affected by maintenance trouble. A few of the former are, "Failed to answer 'O.K.," "Failed to repeat 'O.K.," "Asked second time for number," "Cut off," etc.; of the subscribers' irregularities, "Failed to hold line," "Called wrong number," "Left telephone before completion of connection."

A frequent change of lines for observations is made, and they are selected indiscriminately from all positions of the exchange, so that the results are representative of the whole of the exchange.

Having already dealt with lines engaged and their remedy, another lost call is "No reply." These of course have varied reasons for occurring:

1. Subscriber may be slow in answering.
2. Not in at time of call.
3. Subscriber busy, could not answer.
4. Faults on circuits, etc., etc.

It is not an unheard of thing for a subscriber to call the exchange after an inward call has been abandoned, and enquires "Who is calling me?" The operator is not in a position to say, and should use the expression "I am sorry I do not know; there is no one on your line now."

The efforts of the Traffic Department seem to be in one direction, that is in giving a quick service for the operating, which is entered in a column marked "Time taken to answer and clear." No effort seems to be made to get the time "Called subscriber answered," reduced.

Every effort should be made to get the subscriber to respond promptly to the call, and in the case of a subscriber having the option of a wall or table set fitted, the table set should always be recommended from a traffic point of view, as the reply is always quicker from this class of instrument, because it is nearly always at the subscriber's elbow, whereas if on the wall, it has to be walked to. The curve which I have prepared is on the block system, and will readily explain the advantage from a traffic point of view of the table set over the wall set as regards speed of answer from the subscriber. Of course the time varies, but I might say only business premises were selected for the test.

On ten different occasions the time was recorded by the chronograph stop watch on ten subscribers with wall sets, represented by the shaded portion in red, and ten table set subscribers, represented by the blue shaded portion. The vertical side or abscissa represents seconds, and the horizontal side or ordinates represents number of tests one to ten.

One curve is superimposed on the other; the excess of red is the lost energy in the exchange or delay in speed of answer over table sets.

The figures resulted as follows:—

Test No.	1—Wall set reply ...	Seconds.	Table set reply ...	Seconds.
1	...	93	...	64
2	...	116	...	110
3	...	93	...	66
4	...	99	...	73
5	...	96	...	71
6	...	119	...	56
7	...	104	...	63
8	...	93	...	78
9	...	107	...	87
10	...	103	...	77

1,023

741

Seconds in favour of table sets = 1,023 - 741 = 282.

Average speed of answer from wall set = 10.23 seconds.

" " " " table set = 7.41 "

Average gain in time over each call b table instrument 2.82 seconds.

The method of dealing with observations is not to discover individual operators at fault, this is rendered practically impossible by team work, and if it were desirable to do so, the service and quality of same does not entirely depend on the operator.

If the records are correctly taken, and analysed at the end of the week or month, investigation often results in removing trouble of a general nature. Taking the case of subscribers who are notorious for long delays, these people can be specially watched and the remedy applied, a quiet talk with the superior official would, I am sure, result in a quicker service from those subscribers. In some of my recent tests, it is surprising how slow some of them are in answering, and in other cases the reverse is the effect. In a few cases of undue delays, I have mentioned the matter, and it is remarkable how quickly they see their mistake, a further observation is taken, and the results obtained show a marked improvement.

In the case of irregularities, such as failing to say the name of the exchange before the number, or, failing to repeat "O.K.," particulars can be obtained from the summary at the end of the month. Thus the supervising staff can be instructed to keep a careful look out for repetitions of these irregularities.

Personally I think the operators should be told and cautioned generally with regard to an irregularity that appears to be numerous. As a matter of principle, attempts should not be made to trace delays and irregularities to individual operators by means of the "Day observation forms." In any case an analysis for this purpose would be inaccurate, owing to team work, reliefs, etc., and to try and allocate faults on such a doubtful basis would be wrong.

#### THE NATIONAL TELEPHONE STAFF DISTRICT BENEVOLENT SOCIETY, BOLTON.

CERTIFICATE for month of May, 1910.

Total number of members, 151.

Total number of members who have paid their subscriptions during the month, 150.

Total amount of subscriptions due for the month, £2 13s. 2d.

Total amount of subscriptions received during the month, £2 8s. 11d.

#### AIRMEN AND TELEPHONE MEN.

"I suppose you will find that the routes round Pollok Estate grounds want a good deal of attention this afternoon," said a fellow engineer to me that morning.

"What's the matter with Pollok?" I asked, "there are only two wires on that route."

"Oh, the aviation display starts there to-day," he said, and I noticed the duplex edge.

"No," I said, with simple dignity, "duty calls elsewhere, and with me duty is law"; but fate had linked me with aviation that day.

About midday I received a command from the office to raise an army, and proceed by forced marches to the aviation ground, as the air of Pollok was dense with airmen tangled in the wires.

I collected a relief expedition and made a dash for the pole.

On reaching the entrance we were met by a deputation of stewards, and assured that, though no actual entanglements had occurred to date, such were imminent, that the aeroplanes were being deflected from their course, that wires are not considered a natural hazard in the flying game, that, in fact, we were spoiling the show, and the crowd wanted its money back.

"Be comforted," we vouchsafed them, "this shall not be."

The stewards conducted us to the enclosure, but no further, it being there imparted to us that stewards, committee men and such minions do not lightly enter the bodily presence of live airmen.

I halted the army inside the enclosure, but without the danger zone, and proceeded on foot, alone and unarmed.

There arose an awed murmur from the multitude, "Oh, these are the telephone men."

The airman was seated on the machine.

I knew he was the airman because he had a square jaw and smoked a cigarette. All serious students of the ha'penny illustrated press know that aviators smoke cigarettes. It shows reckless daring.

For a moment we two strong men faced each other, then I spoke my lines. "I'm from the telephone company," I said.

After a pause for effect I added, "We've come to shift things," and the army glanced to the refreshment tent.

"Welcome, brother," said the aviator, or words to that effect, "wait till I come back and I'll show you."

Then he started the engine, and realising that I was, so to speak, a point in the proposed route, I recovered myself at full value.

When, later, a man donned the climbers and went up a pole, it was something in the nature of a spectacular ascent.

"We are getting some excitement for our money now," said the crowd, "he can go up."



## LONDON AND ITS ORGANISATION.

## CONTRACT DEPARTMENT.

By J. STIRLING, *Metropolitan Chief Accountant*, and W. F. TAYLOR, *Metropolitan Contract Manager*.

(Concluded from page 98.)

Methods adopted to secure new business differ very slightly in the several districts, notwithstanding the class distinctions which in some cases form a very marked line of cleavage between one area and another. With most commercial people, whether Jew or Gentile, rich or poor, the first question to be answered is "will it pay?" If an affirmative can be proved, the contract officer's work is done. In a rich city like London, there are naturally numberless people to whom expense is no object; with such, the usefulness of an adequate telephone system is the main point to be advocated and driven home. Between these two classes is a vast number who have to be convinced that a telephone service is a necessity, and that not only can they afford it, but that they cannot afford to do without it. The arguments of the "new business" man do not vary much; the style of putting them must naturally be adapted to the position of the prospective subscriber—one would not be wise to talk to a bishop, for example, in the free and easy manner which suits the bookmaker—but the main lines of advocacy are the same. One contract officer puts it, "I show what I have to sell to the customer to such advantage that I seldom fail to accomplish my object—viz., to get the person I am interviewing to sign a contract."

Telephone contracts are signed under all sorts of circumstances, but surely the case where a canvasser interviewed a lady while she was having a bath in a bath-cabinet, then passed the agreement for an extension instrument through the neck aperture from which the lady's head protruded, and ultimately obtained it signed, albeit in a somewhat "wiggly" manner, must take pride of place for originality. Mrs. Grundy, we may mention, was not present.

Private branch exchanges on the measured rate have developed considerably during the last year or two. Bearing in mind the existence of a flat rate tariff, this growth has been rather remarkable. Of course, when once a few representative firms had been persuaded of the benefits to be derived from an adequate and properly thought-out system, the power of example was a formidable lever with which to move others. The progress in this branch of the Company's business is best shown by the following figures, taken up to the end of December in each year:—

	Private branch exchange	
	Lines.	Stations.
1907	124	886
1908	431	2,347
1909	707	3,363

Certain large hotels in which installations were fitted a few years ago on a special basis are not included in the above. A *sine qua non* of success as a business venture, particularly in large departmental stores and similar places of business frequented by the public, is a complete advertising scheme to make customers aware that the instruments at all the public counters and boxes can be used by them on payment of a small fee. So successful has this been in at least one case that something like £300 a year is received by the subscriber in fees, and goes a considerable way towards paying the annual charges made by the Company.

In recent years the erection of large blocks of residential flats has been one of the striking features of London's building development. It would naturally be thought that these would present ideal conditions for the establishment of private branch exchanges. Two sets of circumstances, however, have combined to falsify our hopes in that respect. The first is the disinclination of landlords to undertake the collection of fees from their tenants; it has been suggested that those who occupy flats are very keen in scrutinising their bills for "extras," and require each item to be so carefully explained and proved that the management avoid all additions to them as if they were the plague. There are probably two sides to

that story. Anyhow, the difficulty is one which we have not found it easy to overcome. Trouble No. 2 arises on the question of operating. Where only a limited number of the rooms have extensions installed, it does not pay to have a properly qualified operator at the switchboard. The patient and long-suffering hall-porter, therefore, has the answering of telephone calls added to what he considers the already heavy burden of his responsibilities; when he does answer a call, as one of many other matters requiring attention, he may not be exactly in that chastened mood which can bear with equanimity the choice reproaches of an angry caller. The inevitable explosion results in the telephone service being discredited, and the Company blamed. Great care has, in consequence, to be exercised in accepting contracts for such buildings, as, unless efficient operating can be guaranteed, it will be far more satisfactory to the tenant and the telephone administration alike to have a direct exchange line to each suite of rooms in which telephone service is required.

To a man whose sense of humour has not been blunted by disappointing results, contract work affords some moments of quiet enjoyment over the curious things people will say and do. Was it facetiousness, or a delightful buoyant hopefulness in the future of scientific achievement, which inspired the gentleman who asked a contract officer if he thought that in the near future subscribers in London would be able to communicate with people in South Africa. That useful phrase "Wait and see" had not then been invented, so the answer was "Some day, perhaps: not yet." To which came the reply, "Well, when they can, give me a call."

There is also the case which, with slight variations, we meet almost daily, of the lady who, when it was explained that her line could not be got through, owing to wayleave difficulties, could not understand why people could be so disobliging. Only a short time before, the good lady had flatly refused to allow a neighbour's line to be attached to her property. It ought to be said that inconsistencies of this kind are not a prerogative of one sex; the difference probably is that men see and even admit the inconsistency of it; the ladies somehow can't or won't.

The contract officer certainly had the laugh on his side in the end, when a small group of tradesmen openly boasted that they could use a certain neighbour's telephone free. The free service was very promptly stopped, and three new orders for exchange lines booked. Pirates of that kind are worth watching for; the exchange staff can give valuable help in their detection.

Revenue-earning possibilities played an important part in the outlook of the lady who wrote to say that she would be pleased to see someone at the telephone, and then explained to the contract officer that as her shop had a formidable array of chimney stacks it had been suggested to her that the Telephone Company would pay "something handsome" to have the telephone attached to the chimney. Such childlike faith deserved a richer reward than was bestowed.

Call office development has had a good share of Contract Department attention. Up to a few years ago, one had to search very diligently for a public call box, and then the chances were against one being found. Now all that is changed, and London will bear comparison with any large city in the effective provision of public telephones. The old theory of a call office in every block has now gone by the board, and it has been realised that while such a rough and ready ideal might have had some force in undeveloped and congested areas, a more scientific principle is required to secure economical working and adequate distribution according to the needs of the public. There are streets and places of rendezvous in London where it would be almost impossible to have too many call offices, and it is in such localities that all our best-paying ones are situated. Obviously there are other neighbourhoods where no amount of telephone facilities will succeed in cultivating the telephone habit to a paying extent; as call offices cannot be installed on a philanthropic basis, and the expense of maintenance is considerable, very great care and discretion must be exercised before the Company is committed to the heavy expenditure involved. It has been said, "If it doesn't pay, we can take it out;" the charges involved render this a costly form of procedure, and a policy of forethought scarcely needs to be commended as infinitely superior to that of cutting your losses. The total call

offices in the Metropolitan area at Dec. 31 in each of the last four years was as follows:—

1906.	1907.	1908.	1909.
2,140	2,779	2,959	2,996

The reason for the drop in the increase for 1908 and 1909 is that in the former year we began to call a halt in the "forward" policy of planting call offices at more or less arbitrarily prescribed distances from each other, and also commenced a salutary process of weeding out the worst specimens of unsuitable and non-paying boxes. The result was a pronounced diminution in the rate of growth and a welcome increase in the average takings per box, with, of course, a corresponding decrease in the percentage of maintenance expenditure to revenue.

Of the 2,996 call offices at the end of December last, 357—12 per cent.—were at railway or tube stations. At many of these the number of boxes could with advantage be trebled and quadrupled were space available, or could the authorities be persuaded to grant the further facilities. There is an undoubted preference on the part of the public for call boxes not situated in shops and private premises; hence the rapidity with which the takings at an additional box in a railway station reach the level of the old one without in any way reducing the amount taken at the latter. It also shows that there is an immense public demand for the service, and it is difficult to understand the policy of the railway management which declines to allow provision to be made for it.



FIG. 4.

The records of busy lines furnished by the Traffic Department are most useful in pressing for auxiliary lines. In the City it is estimated that in at least 60 per cent. of the cases referred from the exchanges new orders are obtained. As a rule the subscriber when approached denies with more or less warmth that his installation is inadequate to deal with the traffic. The figures of engaged calls, and probably the telephone numbers of a few good customers who could not get through to him, however, constitute evidence which it is rather difficult to shake; and if it is well rubbed in that business is probably being lost through his failure to appreciate the true value of an immediate service, the order can generally be pulled off.

Training staff for contract work is a topic upon which much could be said. There can be little doubt that a proper school such as has been established for operators would solve many of the difficulties met with in securing suitable men and giving them the necessary education in the telephone business. It is said that experience will soon enable a man to feel his feet; that is generally a more costly method than telling a man all you can first and leaving it to experience to tell him how best to apply his knowledge. Considerable care is naturally bestowed on the process of selection, and in many cases it is manifest, after a few questions, that applicants are quite unsuited for the work. A candidate having been

selected, he has to apply through the Ocean Accident Guarantee Corporation for a guarantee of £25 in favour of the Company; this was found necessary to prevent the entrance into the Company's service of a certain undesirable class of man who had previously made a happy hunting ground of the department for a brief space, then departed compulsorily, and left to others the reaping of a harvest of weeds which he had sown. Literature bearing on the Company's work and rates is then given to the new officer to study, after which he is taken in hand by the contract agent, instructed in the Company's methods, shown how to fill up contract forms properly, and given the main arguments necessary to clinch a contract. The "dummy" interview is the next stage through which the pupil has to pass, an experienced contract officer playing the part of prospective subscriber who wants to know a lot, and the contract agent being a combination of audience and judge. Following this last ordeal, the novitiate is completed by a short turn "on the road" with an experienced officer, and a visit to the exchange, where the elementary points of switchboard working are made clear to him. This curriculum has worked well in practice, and to an adaptable man ought to be sufficient for most everyday purposes.

All "sales" work is under the charge of a sales manager, who deals with orders throughout the whole of the Metropolitan area. Competition is very keen, and good orders have to be wrestled for with many eager combatants. Unfortunately a good deal of "shoddy" work at cheap rates is done by worthless firms who are here to-day and gone to-morrow; the Company having a reputation to maintain cannot undertake low-grade jobs of that kind, and consequently business people whose knowledge of telephone equipment is limited pass orders elsewhere, only to regret it later when "the chickens come home to roost." The guarantees given with many of the cheap installations fitted to-day are not worth the paper they are written on, as long before the guarantee has expired the firm giving it has. In the long run the policy of sound work tells, and during the last year or two many orders have been got because it is known that the Company can carry out orders by skilled workers in a skilful manner.

It is requisite that sales officers should be able to estimate on the spot for installations, unless of a complicated character. They must therefore possess some technical knowledge, and for that reason are more difficult to obtain than contract officers. One effective method of keeping sales canvassing staff at a minimum is to encourage all the company's employees in every department to bring in sales orders or pass on any information which may lead to an order being secured. Inspectors, fitters, new business and cessation officers—all who come in contact with the public can help. The policy has certainly been successful in London, but even here there are still wider possibilities in store if the desired interest could be engendered. The commission paid helps the officer concerned; the order got helps the Company's business, and thus assists in providing work for other members of the staff. The number of sales orders dealt with during each of the last two years—

1908 =	2,138
1909 =	2,430

shows that the department is doing valuable work. Many of the jobs are only for repairs and replacements at existing installations, but others are substantial contracts, involving a fairly heavy outlay, and bringing in a commensurate profit. We are satisfied that it pays to foster this branch of the business.

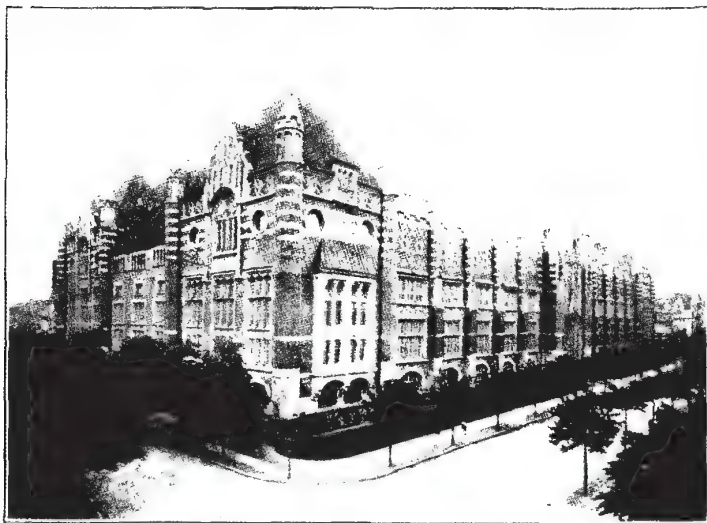
There are many ardent workers on the contract staff. That sounds rather trite, remembering the assiduity with which enthusiasm and other virtues have been drilled into them, through the columns of the JOURNAL, and in other ways. However it has come about, they have certainly imbibed the spirit so alluringly and eloquently presented to them. Contract officers, it must be admitted, have not an easy time of it; the work is no doubt often interesting, and may even be exhilarating, when trying to convince a prospective subscriber that he is being given advice "entirely for his own good." The other side of the picture comes on "off" days when orders are scarce, and no amount of persuasive eloquence seems to exercise any effect; then discouragement and depression set in, and the poor canvasser "dreams o' nights" of signed contracts which elude him as he is about to grasp them. The best man is he who accepts such ups and downs of fortune



philosophically, who is equally cheerful whether the maid announces him as "the gentleman from the Natural Telephone Company" (as has happened more than once) or does not announce him at all: who puts his best foot foremost on good days in order to make up for the ground lost whilst the order barometer was low. There are many such in the Company's service, and they are the men upon whom the Chief relies when things are inclined to get stale, and a special effort is required to convert them to a happier and more inviting condition. It is by the work of such men that successful Contract Departments are built up.

### THE NEW HAMBURG EXCHANGE.

WITH the opening of the the new Hamburg Exchange the process of modernising the extensive telephone system of that town is brought to a conclusion. This new exchange, with its ultimate



capacity for 80,000 lines, constitutes the largest exchange in the world. Special new and difficult problems arose from the enormous size of the exchange, but the principal point of view in the technical construction was to attain the greatest possible celerity in getting connections through and to place before Hamburg a service worthy of the importance of its commerce. The common battery system now preferred as the best for all large systems was introduced, together with the call distributing system in conjunction with a divided board, by the help of which each calling subscriber on receipt of his request is in a moment directed to an unoccupied operator, and thereby the certainty of the desired rapidity of working is assured.

The call distributing system rests on the principle of a division of work founded on a close observation of telephone service and its variable traffic. Whilst under the ordinary system each operator is allotted a certain number of subscribers' lines all of whose connections she must carry out alone, under the divided-board system the incoming calls before being answered pass to a position where they are at once so divided amongst the total number of operators that each operator has always only one call to attend to at a time. In this place, the distributing positions are brought in closely packed arrangement the glow lamps representing the calling signals of 40,000 subscribers' wires. Thence a number of junction wires leads to each operator in another part of the office, the answering positions. Special visual signals at the distributing positions denote at all times which of the answering operators are busy and which are ready for the receipt of calls, and therefore unoccupied. When a call is received at the distributing board it is at once passed on to one of the latter operators, who asks the subscriber for the group-number he requires. In the Hamburg Exchange the subscribers' wires are divided into groups of 10,000. On the answering operator devolves the calling of the connecting

office, which consists of four divisions corresponding to the above-mentioned groups. As the distributing office is informed as to the answering office, so the answering office is able to learn whether the operators of the connecting office are busy or unoccupied. Here also the call always reaches an operator who is ready forthwith to make the connection. The connecting operator asks the number of the desired subscriber and makes the connection. The calling of the wanted subscriber is repeated automatically at intervals until he replies. The principal features of the divided-board system are quick completion of connection, however busy the traffic, avoidance of overloading of one part of the staff during simultaneous idleness of the other part, and therefore better utilisation of the working strength, and finally an increased security to the subscriber of quickness of connection due to the even loading of individual operators.

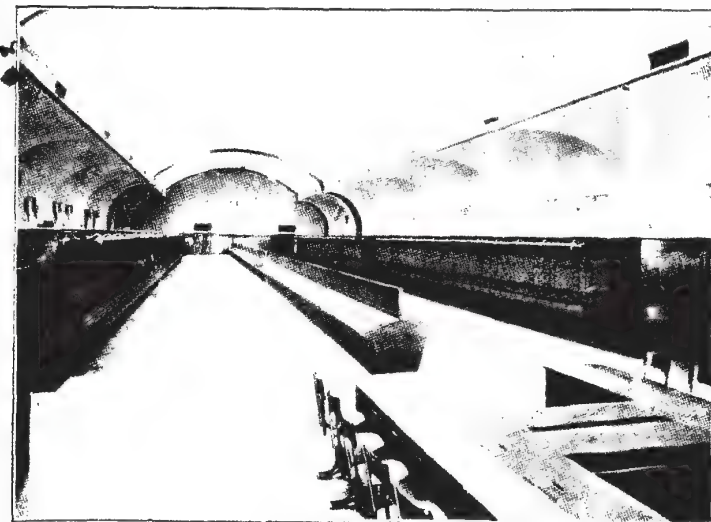
The new Hamburg Exchange\* is a building expressly designed for the purpose and erected by the Imperial Postal Administration at the corner of Binder and Schlüterstrasse. In its external appearance alone the building gives evidence of the enormous extent of the plant within.

The room containing the local exchange is situated in the uppermost story, is of hall-like shape, 20 metres broad, 9 metres high and 132 metres long. Both ends of the hall are cupola-shaped, and in one of them the distributing office is located. Along the length of the hall run the four imposing rows of switchboards for the four groups of subscribers, and in the middle are the tables of the answering board. The simplicity of the arrangement according with the architectonic decoration of the hall gives the observer a pleasing impression of suitability of all the parts.

An adjoining room on the upper story contains the supervisory office of the local exchange, in a way the brain of the establishment. From here the service in all its branches is watched and regulated, faults are observed, the idle made attentive, the varying load of traffic is observed, and therefrom the requisite number of staff is determined.

To the technical plant of the local exchange belong 112,700 relays, which close and reopen the circuit for the calling signals of the numerous lamps—in all, 70,000.

Fifty-five thousand jack strips (1,100,000 single jacks) are installed, and in order to connect these jacks with one another and with the relays, keys, connecting cords and other apparatus inside the exchanges, 1,000,000 metres of cable were employed, the single



wires of which comprise a total length of 35,000,000 metres. There is a total of 15,000,000 soldered connections.

The current for the microphones of all the subscribers' apparatus, for the numerous signals and the relays is supplied by two

\* An illustrated article describing this building appeared in our issue of November, 1906.



accumulator batteries, each possessing a capacity of 7,800 ampere-hours and sufficing to cover the requirements of the exchange for 24 hours.

For the service of the total telephone traffic of Hamburg, Altona and Wandsbek a staff of 1,500 is employed, for whom commodious locker accommodation, refreshment and rest rooms are provided in the new building.

The trunk exchange to accommodate the long-distance traffic is situated in the hall on the second floor. Like the local exchange it is fitted with the most modern apparatus and has been in operation since September, 1908, and by its good working has given satisfactory evidence of the suitability and excellence of its arrangements. The trunk boards consist of twelve double rows serving 240 trunk lines, connecting with the whole of Germany and the most important cities of neighbouring countries.—(Abstracted from an official pamphlet, *Das neue Fernsprechanst Hamburg*.)

## TELEPHONE WOMEN.

### LXXIV. MARGARET ELIZABETH EVANS.

MISS MARGARET ELIZABETH EVANS, Clerk-in-Charge, Penarth, joined the Company's service early in 1900 at the Cardiff Exchange, and occasionally acted as a Supervisor in the Cardiff Exchange. She was transferred to Penarth as Clerk-in-Charge in May last.



MARGARET ELIZABETH EVANS.

Miss Evans is very enthusiastic in her work, is very ambitious, and has very high ideals of what telephone service should be. She has been a member of the Cardiff Telephone Society since its inauguration, and also an active member of the Operators' Thrift Club.

### LXXV.—LILY RIGGALL.

MISS LILY RIGGALL, Clerk-in-Charge of Grimsby Exchange, entered the Company's service in November, 1890, and has therefore nearly twenty years' service to her credit.

Her first experience was of a type of board which required for its operation certain gymnastic performances—a craning of the neck to the transmitter and screwing of the foot round the board to the transmitter switch. Such contortions are now, happily, unnecessary.

Miss Riggall has seen the evolution of telephone working from the day of the primitive "flapper" indicator, which roused the house when it fell, to the No. 9 C.B. system now installed, and, as illustrating the growth of traffic, Miss Riggall remembers the time when fifteen trunk and 100 local calls was considered a busy day. The load is now over 300 and 6,500 respectively, and in Grimsby

there are over 1,000 exchange instruments, five sub-exchanges and an operating staff of nine.

Miss Riggall has served under three district and three local managers. She has always studied the interests of the Company



LILY RIGGALL

and subscribers, and all testify to her unfailing attention and courtesy.

Miss Riggall has no particular hobby, but is an enthusiast in her work and is fond of reading.

## SPECIAL CLASSES FOR NATIONAL TELEPHONE COMPANY'S EMPLOYEES AT THE MANCHESTER SCHOOL OF TECHNOLOGY.

For the third year in succession classes in telephony, especially designed to meet the requirements of the Company's staff, have been held at the above school. Twenty-nine students were enrolled for the advanced stage, and 26 for the elementary stage. The examination was held on April 13, and the following results obtained:—

ADVANCED STAGE (Lecturer, G. S. Wallace, Chief Electrician).

First-Class Certificates: M. A. Clarke, J. N. Hindle, S. G. Pearson, J. S. Cheetham, J. M. Jackson, G. H. Taylor and J. H. Wilson

Second-Class Certificates: C. F. Chambers, J. Dawson, R. Mentasti, W. J. Blacow, J. H. Holloway, T. A. Minta, G. H. Bradock, A. Jones, J. C. Wrighton and T. B. Knight. Failures five.

ELEMENTARY STAGE (Lecturer, J. Hayward, Chief Fitter).

First-Class Certificates: A. Holt, G. McGowan, J. Sumner, J. E. Locke, F. Reilly, J. H. Smith and C. H. Teasdale.

Second-Class Certificates: H. Cleary, M. Hamilton, W. J. Cassidy, C. Kibble, H. Hughes, J. L. Sands, R. Howarth and H. Williams. Failures six.

## A POLE ON FIRE

A FIRE took place in Hamilton one evening recently under somewhat unusual circumstances. The Clyde Valley Electric Power Company supply current at 10,000 volts to various collieries in the district. The wires from the underground mains on the country roads are carried on wooden "H" poles across country to the collieries. The wires are bound on to insulators which are fixed on iron arms bracketed to the wooden poles. During the evening, which was a very stormy one, one of the wires burst its binder, the wire falling on the iron arm, heating it to a white heat, and eventually setting on fire the creosoted "H" pole, which was burned to the ground line. Owing to this line of poles being on high ground and in open country the conflagration could be seen for miles, the country in the vicinity of the burning pole being very brilliantly illuminated. It is a matter of surprise that the fuses did not blow, as a result of what was practically a short circuit, and the current could not be cut off until an employee of the Supply Company withdrew the switches at the distributing station.

### THE TRANSMISSION OF SOUNDS.

WE quote from an interesting article in the *Transmitter* of Denver. It contains some general information on the subject of vocal sounds, and some useful hints to operators and all speakers over the telephone system:

We read that the telephone transmits sound. It does not, however, transmit the original sound, but electrical waves carry vibrations corresponding to those of the vocal organs or other sound producers, reproducing them at the distant receiver, which emits its own sound identical with the original. What sounds are really transmitted over the telephone, and is there any interference by external vibrations? Due to the lack of space, we cannot dwell on all kinds of sound, but will refer particularly to the transmission of speech sounds, for the chief use of the instrument is to produce conversational tones, and will devote a few minutes to a study of the alphabet.

All public speakers, actors and singers must learn from the beginning that the vowels carry the sound because they compel an open mouth and throat which acts as a sounding board, and the action of the vocal cords, which are the only human means of creating sound, is unimpeded or muffled by the lips or tongue. For instance, take the sound of "a" in "Kate," or better, as in "father," and note that there is no real sound of the "K" until the sound of "a" is given; also note that "t" in "Kate" is purely breath and carries no sound in itself. Notice the "f" in "father," which has no carrying qualities until the "a" is sounded. Let's analyse the alphabet. Use of

- a—sound.
- b—very little sound until followed by a vowel.
- c—practically no sound.
- d—very little more than b.
- e—sound.
- f—purely breath; no sound.
- g—some sound, but very guttural.
- h—purely breath.
- i—sound.
- j—some sound, but very guttural.
- k—practically no sound.
- l—little sound (formed by a tip of tongue being placed high against the roof of the mouth, the sound coming only past the sides of the tongue).
- m—humming sound; nasal.
- n—sound, but very nasal.
- o—sound.
- p—purely breath.
- q—purely breath.
- r—the trill carries sound, and "r" is sometimes called a semi-vowel on this account. Other uses of "r" carry very little sound.
- s—a hiss, but carries very little vocal sound.
- t—purely breath.
- u—sound.
- v—more sound than "f," but muffled.
- w—no sound, except as a combination of "oo" and "ä" ("oo," "ä," "z,"—"was"). "w" compels heavy breath action when followed by "h," as in "where."
- x—combination of "k" and "s" or the sound of "z."
- y—sound, or rather a combination of "e" and "u"; as, "e," "u," "ok"—"yoke." "y" also takes the sound of "e" or "i" at times.
- z—like "s," has but little sound.

In selecting prefixes for exchanges it should always be considered that the vowels a-e-i-o-u and y carry sound; m and n are very nasal and are very easily confused, carrying very little sound over the telephone, and that terminations in vowels are the most desirable; b, d, g, j, l, r, v and w have but very little sound in themselves, and c, f, h, k, p, q, s, t and z are breath consonants and are very bad to use, except in the middle of words where they can be preceded and followed by vowels. Enunciation plays a most important part in telephone business and operators should be trained to produce the sounds of the alphabet in a little extreme manner and to make use of vowels at every opportunity.

If every operator could be given elocution lessons, she would very soon learn that these principles must be adhered to. You can't build a box (closed lips) around sound and expect it to carry well. Breath impulses against a transmitter diaphragm have a tendency to interrupt the real sound waves, and this is why a quiet manner is so essential in talking over a telephone. Distinctness does not mean loudness or explosiveness or affectation. It calls for deliberate naturalness.

As stated before, the more the sounds come from the mouth the easier they are transmitted over the telephone. People who try to talk with their mouths nearly shut are hard to understand. Persons who talk in a thick manner have not acquired perfect control of the tongue, and adenoids and other obstructions in the nasal passages destroy the nasal over-tone necessary for a smooth voice, and the sound of "m" and "n" is impossible to produce correctly.

Supervisors everywhere should take interest in training their operators to make the best of the vowel sounds and cultivate a pleasant tone of voice. For relaxation and strengthening of the voice laughter and yawning are the most beneficial, and nature will do its work if you live in a happy mood and take care of yourself.

### MR. CARTY ON THE POSSIBILITIES OF SPEECH TRANSMISSION.

MR. J. J. CARTY, the well-known Chief Engineer of the American Telephone and Telegraph Company, addressing a recent meeting of the Telephone Society of New England made some interesting remarks on the possibilities of speech transmission. Referring to an early trunk line, that from Boston to Worcester, which represented the limit of long-distance transmission some 30 years ago, Mr. Carty said:

"This Worcester line was made of iron, and it was a very large size. The difficulties growing out of such a construction I need not emphasise. Iron wire of all kinds was tried and failed. Copper, it was realised, was the material from which to make successful long-distance lines. But copper as then obtainable would on a day like to-day, for instance, slack out, and no matter how cold it got to-morrow it would never get back; and a succession of hot days would bring the wire down to the ground, so that it made it very easy for the linemen to shake out the crosses. The story of the development of hard-drawn copper wire is an old one, and it has been often told.

"Then the importance of the-transmitter was realised, and very great improvements were made in the transmitter. The result was that the transmitters used by the American Telephone and Telegraph Company have been for years and are now the best and most efficient transmitters in use anywhere in the world. But even with the best transmitters and with hard-drawn copper wire the limits of speech transmission were reached. Then came the story of loaded lines, a very remarkable development, particularly in view of our early work. An inventor proposed to insert into the line a lot of magnets having inductance, the very thing we had been labouring all our life to take out of the line and keep out. But he showed that if these magnets were placed in the line, or these inductance coils, to speak more accurately, placed in a particular part of the line, with proper regard to the wave length, that their effect would be beneficial.

"The result is that very, very great improvements have been made in overhead lines and in underground lines by the use of this loading invention. But the loading invention and the complexities of which it must form a part had not yet been adjusted to each other. For instance, we were not able to load a No. 8 line. That is, the heavy copper wire upon which we would have to rely for our transcontinental work. It was not practicable to load such a line for the reason that a higher degree of insulation was needed under those conditions—under the conditions where you used No. 8—a higher degree of insulation was needed than when a No. 12 was used. I won't undertake to explain why that is the fact.

"So one of the results of my California trip was to stir up the whole question of this matter of insulation, work upon which was proceeding, but very great pressure was put on. A review of the whole problem of insulation was made. It was found that in America glass insulators are the rule, but in other parts of the world porcelain insulators are the rule; and it was difficult to find from anybody why glass was used or why porcelain was used. A very exhaustive study, covering not only experience in this country but in all other countries, has resulted in the development of a porcelain insulator which, when applied to loaded lines of No. 8 gauge, very largely removes the insulation difficulty. But it also appeared that there was difficulty at the bridle wire. The braid upon the bridle wire used in these lines in wet weather conducted the speech, so to speak, and then we had the problem of insulating the insulator. That was successfully accomplished. An experimental line was loaded between New York and Chicago, and in dry weather the degree of transmission was very remarkable; in wet weather it fell off. But with the improved porcelain insulators, with the improved bridle wire insulator and with an improved transposition method the insulation on that line now, under the most unfavourable weather, is entirely satisfactory, so that we have accomplished the problem of successfully loading the No. 8 lines.

"But that is only part. It has not been practicable to phantom the No. 8 lines. The coil—the induction coil used for that purpose—was good enough for the No. 12, but was insufficient for the No. 8's, and the reason was that it was a coil through which we attempted to ring and talk; it was a compromise coil. We tried to

please both sides, with the usual result, we did not please either. It was not a good talking coil. So we designed a coil that was good for talking, and then developed a high-frequency ringing current. The result is a coil available for phantoming No. 8's in which the losses are practically negligible. The bearing of this phantom work and of this loading will appear as I go on. It had not been possible to phantom loaded wires of any kind. We were obliged to choose between a loaded circuit or a phantom circuit. If we made a phantom circuit we could not load, and that was a state of affairs not to be tolerated. That has been tackled, and a method is now issuing which enables us to load phantom circuits or phantom loaded circuits. So there we have started in with No. 8's, that is, the big wires. We can load them, we can phantom them, we can phantom them loaded.

"Now see what that accomplishes. Between New York and Chicago we will load two pairs of No. 8's. These will be phantomed. That work is going on. Between Omaha and Denver we are stringing two pairs of No. 8's. They are to be loaded and they are to be phantomed. Between Omaha and Chicago we have one pair of No. 8's that is to be loaded. See, then, the circuit that we can construct. From New York to Chicago a phantom circuit composed of two loaded 8's. That phantom circuit will be the equivalent of a pair of loaded 6's, and it will be got at a trivial cost. We will make the company a present, so to speak, of a pair of loaded 6's between New York and Chicago. Then, between Chicago and Omaha, that phantom circuit will become a single circuit, but at Omaha again it will be connected to a phantom circuit, the loaded 8's to Denver, and over that circuit we expect to get a talk which will be practically commercial and good, between New York and Denver. . . .

#### PRESENT OPPORTUNITIES FOR YOUNG MEN.

"The question is often asked whether nowadays, in the telephone business, there is any opportunity for young men. Now my conception of the telephone business—and I know that it is the conception of the highest authorities we have—is that our work will not even nominally be accomplished until we have obtained this result: That any man in the United States, wherever he may be located, may, within a reasonable time, be connected with any other man in the United States, and talk to him successfully. That is a very large order. Just contemplate for a moment the magnitude of a plant of that sort. If I had time I would have liked to have sat down and forecasted it. We are talking of a 30-year period. See the magnitude of the telephone plant which will be under your charge. There is no plant of that character in the universe. It is not like a great steel works, where the factory can be viewed at once, where your plant can be examined, but our property, our wires, our interests, our methods and our men permeate into every jurisdiction in the United States—into every State, into every Federal jurisdiction, into every city, into every town, every village and every borough, every street and pretty nearly every back yard. There is no problem approaching that in complexity, whether viewed from the standpoint of the political economist, from the legal standpoint, from the financial standpoint, from the standpoint of the engineer, or from the commercial standpoint. There is no plant, there is no problem, there is no activity that will compare with it in magnitude, interest, importance and opportunity."

#### THE TELEPHONE AND HISTORICAL PAGEANTS.

DURING recent years historical pageants have occupied considerable public attention. Some information therefore as to the part played by the telephone in their presentation will not be without interest.

When these lines appear in print the Chester pageant will be a thing of the past. The eight episodes so faithfully portrayed with as much attention to detail as it was possible to give have joined their prototypes in the historical past. That it has been a great success, financially and otherwise, and what is generally recognised as one of the finest pageants of modern times, is due to the whole-hearted way in which the people of the city and county threw themselves into the work.

Played in Eaton Park on one of its fairest sites, a field

specially lending itself to a display of this kind, surrounded on three sides by trees, fine weather only was wanted (and with the exception of one day was enjoyed) to show to the best advantage the 4,000 odd performers and some 200 superb horses—chiefly from the Duke of Westminster's own stud.

In previous pageants the Company had, in some cases, supplied telephone instruments, but the staff to work them was left in the hands of contractors with the somewhat natural consequences that when the telephones were required the staff "was not."

The Chester pageant master, Mr. Hawtrej, on this occasion was insistent that not only the instruments but the attendants should be supplied by the Company in order that the service should be reliable. The Company was asked to set up a telephone service between the master's controlling box on the top of the grand stand and various points of the ground, which will be seen on the accompanying plan, the object of the service being to convey instructions from the master to the performers, or troupe of performers, when to "go on."

There were twelve stations in all supplied by five circuits, two direct and three party lines, the latter containing three, three, and four stations respectively. The direct lines served, of course, the most important points, being those most frequently required.

The circuits were carried in one pair V.I.R. cable—ordinary leading-in wire—with earth return, so that it was not necessary to erect more than one V.I.R. on the same route. The cable was attached to trees, to scenery, and at other points to scaffold poles provided by the pageant authorities and erected by the Company.

The names of the stations, and the arrangements for ringing, were as shown here.

Number of station.	Switchboard number.	Name.	Code of rings
1	1	Band ... ..	—
2	5	North entrance ... ..	1
3	5	Middle entrance.. ... ..	2
4	2	Home (stage managers) ... ..	—
5	5	South entrance ... ..	3
6	5	The Firs ... ..	4
7	3	The Spinney ... ..	1
8	3	The Passage ... ..	2
9	3	The Grove ... ..	3
10	4	Far Gate... ..	1
11	4	Rowton Gate ... ..	2
12	4	The Guns ... ..	3

Only the two direct lines were allowed to "ring up." The handles were taken off the other instruments to prevent calling from them.

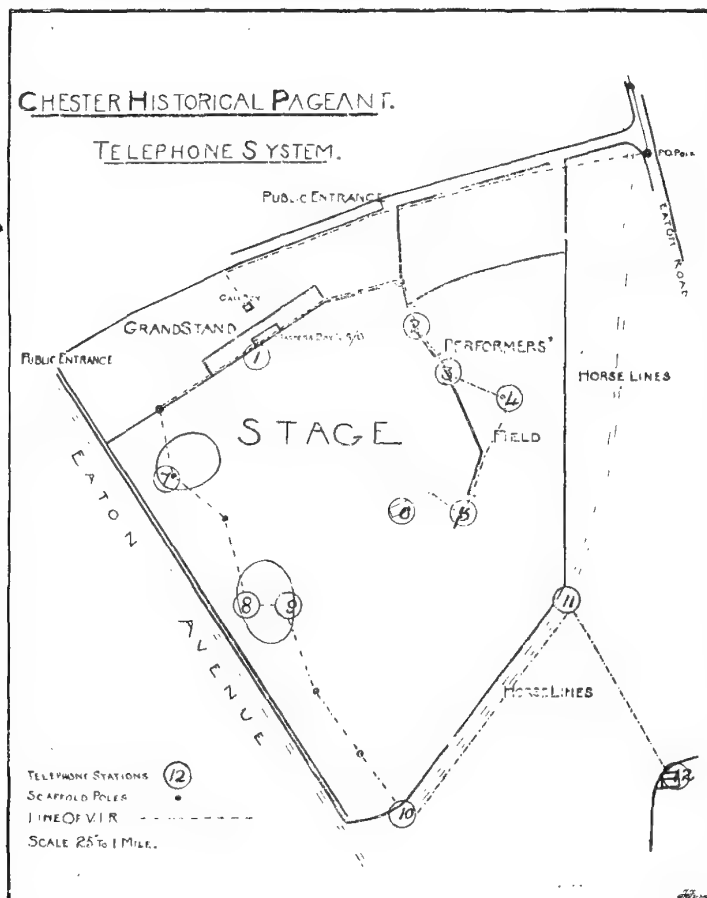
It was necessary to put in the master's box a reliable operator who was found in one of the Company's apprentices. The attendants at the other telephones were young ladies specially engaged for the work.

Each telephone was enclosed in a box screwed to a tree, and each attendant was provided with a chair.

The pageant lasted for a fortnight—a week of public rehearsal and a week of finished performance. The hour of the former was at six in the evening, and of the latter at 2.45 in the afternoon. The performance lasted some three and a half hours. The operating staff assembled at the Company's office one hour before the performance began. A responsible officer was told off each day to walk up with the girls to the pageant ground and see them posted at their positions. Each station tried its instrument and circuit with the controlling operator in sufficient time to enable anything that might be out of order to be put right in good time. Each attendant was provided with a special home-made badge, consisting of the well-known bell sign stuck on a disc of cardboard and attached by means of a blue ribbon and safety pin to the breast of each attendant. The telephone arrangements worked without a single hitch of any kind, and were warmly spoken of by the master, of whose unsolicited testimony a copy is appended.

The order, efficiency and punctuality of all the arrangements connected with the pageant were very striking, having regard to the large number of performers, most of them unaccustomed to discipline of any kind. The most laconic command given by the master to our switchboard operator (occasionally anticipated by the latter) was transmitted instantly by him and was seen to be as





quickly responded to in the sudden appearance of either "band" (at the opening), "fairies," "horse," "guns" (when to be fired), "crowd," "property men," or what not, from their various hidden points of assembly.

- To the District Manager,  
National Telephone Company, Limited, Chester.

Dear Sir, As master of the pageant I wish to express to you my very great appreciation of the splendid manner in which the telephones were worked on the ground during the past week.

At neither of the pageants which I have previously managed have I met with anything like the efficiency which proved such a material help to me on the present occasion.

I am, dear Sir,

Yours very truly,

GEORGE P. HAWTREY.

July 25.

## A FEW THOUGHTS ON SUPERVISION—FROM AN OPERATOR'S POINT OF VIEW.

BY FLORENCE KERRIDGE.

WHAT an influence a supervisor has over her section. The class of work done by it depends almost altogether upon her. The operators all take their cue from her—perhaps unconsciously—but certainly they do. How much better an operator will manage if she knows her supervisor is taking a keen interest in the work, and is ever ready to help her small staff in every way that is possible. Sometimes an encouraging word to a young operator will work wonders. She may be feeling tired and a bit discouraged, but if the supervisor shows that she is taking an interest in her, not passing over careless work, but in a kindly manner pointing out her mistakes, how that operator will strive to come up to the standard

expected of her, and respect the supervisor far more than if she had spoken sharply and showed irritation at her shortcomings.

The supervisor who is most respected and has the most influence over her section is not the one who flies hither and thither calling out numbers for anyone to take, regardless of the fact that the other boards are quite as busy as the one from which the numbers are being called. I have noticed this many times, and in exchanges where there are signals that drop down, they have been put up when the number has been called out, the supervisor not having made it her business to see that it was being answered; and in a great many cases the call has not been taken, and consequently the subscriber has had to ring again. If, instead of calling out numbers at random the supervisor would quietly watch the traffic and when opportunity occurred call out a number and see that it was taken it would be much better than unduly exciting herself and everybody else near her, with the result that the work is hurried, the operator irritated, and everything goes wrong. Instead of the subscribers hearing a clear, cheerful voice, which invariably forces them to speak cheerfully, at the other end of the wire—and a cheerful tone is generally a clear one—they hear something like "Num plea" "Plea" and so think the operator abrupt and uncivil.

I have rejoiced and suffered under good and bad supervision and so realise what it means to be under a good supervisor.

As regards the senior operators relieving the supervisors, personally I think it a splendid idea, for it gives the operator a wider experience and a sense of responsibility which is good for her. She takes her place again at the board with very different feelings.

Although it is looked upon as an honour to take the supervisor's place, and an operator would feel very much aggrieved if she were passed over, she does not find it a pleasant sensation at first, but in the course of a short time begins to look forward for the change and it becomes a relief from operating. Consequently she returns to her work refreshed both in mind and body.

Perhaps it would be of interest to relate the experiences of a senior operator "brought out" for the first time.

Naturally she is feeling shy and rather awkward, and finds herself wishing that the floor would open and swallow up the whole room. Anything however rather than show the white feather: so she bravely walks up and down the section, conscious that the eyes of the whole room are upon her, of course not openly, but sly looks and side glances all come in her direction, just to see what she looks like and how she is managing. After she has recovered her breath, it dawns upon her that she should be doing something, so she calls out a number and feels quite alarmed at hearing her own voice. Determined to persevere she grasps some scribbling paper or pad, thinking it will give her some confidence to hold on to something if only a bit of paper. This has the desired effect for the time being, until the exchange manager comes along and requests her not to walk up and down looking like an enquiry agent. After some time patience and perseverance are rewarded and the desired confidence is gained.

To put the matter in a nut-shell, a supervisor, in my opinion, should be possessed of great tact, calmness of mind and patience, and should realise that kindness and consideration to those under her charge not only gains their esteem and affection but gives them a greater interest in their work, thus securing for the Company greater efficiency of working and satisfaction to the great body of subscribers.

## THE TELEPHONE SOCIETIES.

So much has been said of the good work done by the telephone societies, and the interest in them is so general, that we take the opportunity of publishing a full list of these bodies together with some details of their membership and average attendance. It will be seen that they number 56 in all, an average of over one for each district, indeed there are four in London and three in the Southampton district. The largest membership is naturally that of

London with 1,008. Liverpool Operators' Society comes second with 250, and Glasgow Operators' with 234. In the percentage of the average attendance on the total membership, Cheltenham comes first with the excellent figure of 94.2. As this is a small society perhaps the record of the Bristol Operators' (93.5) is even better. Truro, another small society, shows an average of 91.2, Bolton 84.6, Warrington 84.3, Plymouth 81.2, and Coventry 80.4. Among the large societies with over 100 members the ladies are again well to the fore, Liverpool Operators coming first with 55.8, Glasgow Operators second with 50.8 and Glasgow third with 46. London is last with 16.2, but for this there are many reasons. First, the huge and scattered nature of the membership, the distances at which members live from headquarters, the disarranged meals and long journeys entailed—often in inclement winter weather. London shows the largest average attendance (166), but the Liverpool Operators are a good second with 133.6.

Name of society.	Number of members.	Entrance fee.	Annual subscription.	Is there a library?	Number of meetings.	Average attendance.	Per cent. average attendance.
Birmingham ..	71	—	1s.	—	8	34.2	52.3
Blackburn ..	78	—	1d. per week	Yes	7	37.5	72.7
Bolton ..	52	—	2s. seniors 1s. juniors	—	6	39.3	84.6
Bournemouth ..	68	—	6d.	Yes	7	41.4	95.2
Bradford ..	30	—	1s.	Yes	6	15.5	57.2
Brighton ..	35	—	3d.	—	9	21	60.3
Bristol ..	60	—	Nil	—	6	55	94.8
Cardiff ..	80	—	1s.	Yes	6	39	48.7
Cheltenham ..	20	—	1d. per meeting	—	9	17.2	94.2
Chester ..	26	—	3d.	—	6	18.8	68.6
Cork ..	40	3d.	Nil	—	8	26.9	65
Coventry ..	26	—	1s.	—	7	17.4	80.4
Douglas ..	18	—	Nil	Yes	11	14.2	78.8
Dover ..	47	—	1s. seniors 6d. juniors	—	7	27.5	59.7
Dublin ..	80	—	2d.	Yes	9	23.7	35.4
Dundee ..	42	—	6d.	—	6	27	64.2
Exeter ..	28	—	1s.	—	9	24.7	79.5
Glasgow ..	193	—	1s.	Yes	7	88.8	46
Gloucester ..	49	—	1d. per meeting	—	7	26.8	67
Greenock ..	45	—	6d.	—	8	28.1	62.1
Hanley ..	35	—	Nil	—	8	18.8	57.7
Hastings ..	41	—	1d. per week	—	7	28.1	91
Hull ..	58	6d.	1s.	—	6	31.5	94.5
Leeds ..	61	—	6d.	—	8	39.5	55
Leicester ..	35	—	6d.	—	7	20.3	60.2
Liverpool ..	250	—	6d.	Yes	7	55.4	55.4
London ..	1008	—	(110 gentlemen) (94 ladies)	Yes	14	166	16.2
North-Eastern ..	115	6d.	1s.	—	8	22	31.7
Southern ..	63	—	1s.	Yes	7	27.2	34.4
Western ..	15	6d.	1s.	—	8	28.6	54.1
Luton ..	56	—	Nil	—	11	36	65.1
Manchester ..	155	6d.	6d. per month	Yes	10	15.6	28.1
Newcastle ..	54	—	1s. seniors 6d. juniors	Yes	7	36.1	68
Northampton ..	14	—	1s.	—	5	10.2	74.4
Nottingham ..	60	—	1s.	—	9	35.4	58
Factory ..	148	—	Nil	—	9	79.3	42.9
Oldham ..	40	—	Nil	—	5	22	55
Paisley ..	26	—	1s.	—	7	17.7	95.4
Plymouth ..	39	—	Nil	Yes	9	39.5	81.2
Portsmouth ..	85	—	1s. seniors 6d. juniors	Yes	7	41.4	49.8
Sheffield ..	85	—	6d. gentlemen (34 ladies)	—	7	41.5	51.7
Stirling ..	57	—	Nil	—	7	25.2	41.3
Sunderland ..	44	—	1s. seniors 6d. juniors	Yes	7	16.5	72.2
Swansea ..	47	—	Nil	—	6	33.8	71.8
Torquay ..	18	—	1s.	—	8	14.2	76.5
Truro ..	20	—	6d.	Yes	8	21	91.2
Tunbridge Wells ..	46	—	1s.	—	6	18.3	41.6
Warrington ..	50	6d.	6d. per month	—	6	42.1	84.3
Weymouth ..	13	—	6d.	—	7	10.7	75
Wolverhampton ..	80	—	1s. gentlemen 6d. ladies	—	7	48	61.5
Total ..	3766	—	—	—	377	1707.6	3041.9

Number of societies 50. Average members 75.3. Average number of meetings 7.5. Average attendance 34.1. Per cent. average attendance 60.8.

## OPERATORS' SOCIETIES.

Name of society.	Number of members.	Entrance fee.	Annual subscription.	Is there a library?	Number of meetings.	Average attendance.	Per cent. average attendance.
Birmingham ..	185	—	6d.	—	6	71.8	41.7
Bristol ..	72	—	Nil	—	6	62.6	93.5
Cardiff ..	73	—	Nil	Yes	6	41	56.9
Glasgow ..	234	—	1s.	Yes	5	118	50.8
Liverpool ..	250	—	3d.	Yes	5	133.6	55.8
Swansea ..	34	—	Nil	—	6	25.3	74.4
Total ..	848	—	—	—	34	452.3	373.1
Grand total ..	4614	—	—	—	411	2159.9	341.5

Number of societies 6. Average members 141.3. Average number of meetings 5.6. Average attendance 75.4. Per cent. average attendance 62.2.

Total Number of societies 59, average membership 82.2, average number of meetings 7.3, average attendance 38.5, per cent. average attendance 60.9.

THERE is one thing about London, says a writer on "The Rediscovery of London," in the *Daily Express*, which my French friends and myself who are wondering what has become of the London Christmas (*Le Noël de Londres*, which is as well known on the Seine as the much talked of London fog) greatly admire the telephone. You can telephone in London now without losing your temper. Londoners tell me they do not do so, but we do, who are used to telephones abroad. I am certain that all the young ladies in all the exchanges will make the best of wives. Their voices are charming, and their patience and their quickness are a marvel to my French friends and myself.

## NEWPORT THRIFT CLUB.

A THRIFT club has been formed, all the indoor staff being eligible for membership, and it is satisfactory to note the majority of the staff are availing themselves of the advantages to be gained.

Mr. B. Waite, District Manager, has been elected president, with Mr. R. Williamson, Local Manager, and Mr. W. J. Marsh, Traffic Manager, vice presidents.

## THE TELEPHONE IN THE VATICAN.

MR. R. M. CRAWFORD writes:

On reading lately Douglas Sladen's fine book on the Vatican, published in 1907, I came across the following statement, which may interest some of your readers:

"As the Pope feels that his position will prevent him ever visiting his beloved Venice, he has a trunk-line telephone of his own to the Bride of the Adriatic. Nor is this the high water mark of modernity in the Vatican, for the Pope has the first wireless telephone ever erected for practical use."

## BURGLAR CAPTURED BY THE AID OF THE TELEPHONE.

THE smart capture of a burglar was effected at Southampton on June 13 through the agency of the telephone.

The local manager was cycling through the Howard Road about 1.30 p.m. when an agitated servant maid came out of a doctor's residence and informed him that a man had broken into the house adjoining, the tenant of which was away. Having instructed the girl to go back to the house and ring up the Freemantle Police Station, the local manager secured the aid of a driver of a passing laundry van and, a constable going to duty on his cycle fortunately passing at that moment, the laundry man was deputed to watch the premises, whilst the constable and the telephone man searched the house, the burglar eventually being discovered locked in a box room. With the arrival of five other constables in company of Inspector Allison, the house was surrounded and, on the door of the box room being broken open, "Bill Sikes" was discovered seated on a box, an interval of ten minutes only having elapsed from the time he broke in until he was safely under arrest.

## CARDIFF CHARITIES.

DURING the past year the sum of £18 8s. 8½d. has been collected by the staff of the Cardiff district for charitable purposes. This has been located as follows:—

Cardiff Infirmary ..	£	s.	d.
Barry Voluntary Hospital ..	12	0	0
Merthyr Hospital ..	0	15	0
Bridgend Hospital ..	0	15	0
Pontypridd Hospital ..	1	10	0
Cardiff Blind Institute ..	2	0	0
Balance towards current year ..	0	8	8½

£18 8 8½

# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

*Published Monthly at*

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VOL. V.]

SEPTEMBER, 1910.

[No. 54.]

## THE OPENING OF THE NEW EXCHANGE AT HAMBURG.

THE description of the Hamburg Exchange appearing in this issue gives some further details of this interesting equipment.

An engineer's natural desire to experiment with systems of which he has not had practical experience is constantly being repressed by the results of calculations which inform him relentlessly that, provided his data are correct, he is not justified in making the investment. Call distributing systems and divided boards have separately and in conjunction received attention here, but the Company has not installed either, so that when another administration, no doubt using basis figures appropriate to its own conditions, decides to use these methods in a city so important as Hamburg one's interest is at once aroused, and one begins to speculate as to the conditions which permit of it.

The concentration of subscribers' lines in one large building originated on the Continent, and in its early stages seems to have been brought about by a desire to avoid junction working. In this connection it is interesting to note that in the Hamburg system every call is handled by three operators, one of whom, however, only connects the calling line with a disengaged operator. Before the days of automatic signalling this distrust of junction working was to some extent justified, but the elasticity of the common battery system is such that the equipment engineer has generally no difficulty in designing circuits which will give to the traffic authority such automatic and reliable indications as may reasonably be required, and a junction call is very little more difficult to handle from the operator's point of view than a local call, and scarcely distinguishable on the subscriber's part.

As we have previously indicated, we do not wish to question the decision of the Hamburg Administration to instal the system, but we do wish to state quite definitely for the benefit of our own staff our conviction that a given standard of service can be provided

in this country more economically by means of more numerous exchanges, the application of distribution to the subscribers' lines amongst the operating positions according to the load, and by the employment of team-work.

## FALSE ENTHUSIASM.

WHILST we are in the main in sympathy with the trend of the article by our contributor, Mr. NICK, whose argument, broadly stated, is that honest and steady good work is of greater value than a sporadic and self-advertising assumption of enthusiasm, we think he is a little hard on that hard-worked word. Without involving ourselves unduly in philological intricacies, we can fix the root-meaning of enthusiasm as the state of being touched with divine fire. Enthusiasm, therefore, is a somewhat exalted state, and can only be accurately applied in connection with religion, poetry, patriotism, duty and such high matters. As in the case of most words, custom has extended the scope of its application, and we hear the incongruous combinations: "an enthusiastic race-goer" or "an enthusiastic stamp-collector." It is, however, neither possible nor profitable to confine words strictly to the meanings signified by their roots. By "sarcasm" we do not mean tearing the flesh from people's bones, nor by a "cynical" manner do we suggest anything dog-like, as we should have to do if purism ran altogether mad. The word enthusiasm, therefore, will serve well enough to express a state of keen interest in something when that interest is fervent and high minded and when that something is not commonplace or puerile. Simulated enthusiasm, manifested in rushings to and fro, futile gesticulation and external or lip-service of one's calling are quite another matter. Enthusiasm is not to be confounded with hustle; it animates the quiet and painstaking man of science equally with the fervid preacher or reformer. True enthusiasm is a quality which lends to work a brighter hue and a deeper interest; it tends to efficiency rather than incompetence. It points towards success, but if, indeed, it does not always insure it to its possessor, it makes life fuller; and it must be remembered that there are many failures that are more glorious than successes.

## "RUMOUR MANY-TONGUED."

PRECISELY what purpose is served by the circulation of mischievous and misleading paragraphs in the press as to the position of the staff after 1911; whence they emanate; and who are the shadowy officials and representatives alleged to have made pronouncements or been interviewed, are matters equally for surprise and vain speculation. Most of our readers will have seen the statements in the *Standard* and various provincial newspapers which begin: "Eighteen thousand people—men, girls and boys—will be temporarily thrown out of work when at midnight on Dec. 31, 1911, the Government takes over the business of the National Telephone Company," goes on to credit the Postmaster-General with stating that "as vacancies occur he will be able to take on about 50 per cent. of the older servants of the Company," and sketches imaginative pictures of a man of, say, twenty years' seniority drawing 45s. being offered a position at 25s.

The bulk of the staff to whom the contents of Lord STANLEY'S memorandum are well known will, no doubt, have read these paragraphs with complacency and not without a certain amused contempt; but amongst the varied grades and remote stations of so



large a staff as the Company's there must be many members to whom these circumstantial and quasi-authoritative statements caused much needless fear and alarm. We are surprised that such statements should be attributed to the Postmaster-General in so well-informed a paper as the *Standard*, and still more are we surprised that any responsible official of the Post Office should be credited with contenting himself by saying, when interviewed, that "50 per cent. of the staff was a modest estimate of his chief's proposals, and that as opportunity offered *probably* the whole of the staff would find employment under the new régime," when he would of course know that Lord STANLEY'S undertaking provided that all the staff who have been not less than two years continuously in the service of the Company on Dec. 31, 1911, and who are in receipt of salaries of less than £700 a year will be taken over by the State and given equivalent work for equivalent pay. Mr. SAMUEL'S subsequent statement confirms the utter baselessness of the rumour.

### HIC ET UBIQUE.

OUR Manchester correspondent points out that in the results which have just been published in connection with the Correspondence Classes for the past session the Manchester district has done exceptionally well in the "B," "C" and "D" Courses. In the "B" Course nine members of the staff are in the first twenty; in the "C" Course four members of the staff are in the first twenty; and in the "D" Course six members of the staff are in the first twenty. Thus in the three courses we have nineteen members of the staff or nearly one-third of the best results.

From a cursory glance of the schedules it would appear that Manchester has set up something of a record, especially as two Manchester men head the "B" Course with 100 per cent. of marks and a Manchester man heads the "D" Course with 98·7 per cent.

In this column we recently made reference to a paragraph quoted in our contemporary the *Michigan State Gazette* concerning operating in Oklahoma, and concluded by saying "We observe for the enlightenment of our readers that the nearest equivalent of 'stunt' in a civilised language that we can call to mind is *tour de force*."

The *Gazette* after some kind compliments on the JOURNAL, which we heartily reciprocate, gently takes us to task as follows:—

We are sorry about our 'cross-pond friend's limited knowledge of civilised languages. What's the matter with his own? He might have found by consulting a modern English dictionary that "stunt" is "a feat or performance striking for the skill, strength, or the like, required, hence any feat or performance (colloquial)." "He does not try to do stunts,"—L. Hutton." . . . As for *tour de force*—*à bas* it! The idea of carrying over a fine healthy, vigorous word like "stunt" into a slap-on-the-wrist incompetency like "*tour de force*"!

We confess to feeling unconvinced and very unrepentant. We suspect that the "modern English dictionary" referred to is an American one, or at best an English one modernised for American consumption. The author quoted from is admittedly American, and, after all, the inclusion of a word in a dictionary, especially when it is labelled "colloquial" or "familiar," does not hall mark it as good English. The word "stunt" is of doubtful orthography, and utterly destitute of etymology. As to being "healthy and vigorous," "stunt" conveys to the English mind the exact opposite, viz., to dwarf or hinder growth.

According to *Telephony* there is a small independent telephone exchange in a town near Columbus, Ohio, where the plan in operation during the night season when calls are few, is unique. Owing to the construction of the plant the proximity to its lines of high-powered electric light lines, many of the telephones work very poorly at night because of noise. On some lines it is almost impossible to hear because of the noise. When a call comes in for

a physician, or any call which is believed by the operator to be urgent, she telephones the lighting company to turn out the electric lights in the village while the conversation is being held. With this request the light company kindly complies and the conversation is uninterrupted.

A correspondent thinks this might be included in the facilities given by public authorities in America, referred to by Mr. Franklin in his speech at the half-yearly meeting.

TELEPHONE girls, in addition to the sins and negligences of novel-reading, sweet-eating, knitting and gossiping, with which they have from time to time been charged, are even suspected of the most frightful levity to the Pope. Says the *Pall Mall Gazette*:

If there is a publication which is decidedly obnoxious to clerical circles here and elsewhere, it is the supposedly comic journal *Asino*, which is opposed to all form of clericalism, and goes further than does the Munich organ *Simplizissimus* in its attacks on the Church generally. In every number the Pope is criticised in unmeasured terms. Naturally, the *Asino* is the last newspaper office with which the Pope would wish to communicate in any way.

The Pope's sisters are in the country at Frascati, and he wished to speak with them by means of the telephone; but, by a mistake, he was put into direct communication with the *Asino*. When the Pontiff found out that this mistake had been made he was exceedingly wroth, and sent a special messenger to request Signor Luzzatti to discover which of the girls in charge of the telephone had dared to play such a trick.

Signor Luzzatti at once announced to the telephone staff that unless somebody confessed to the awful deed, everybody in a certain department would be dismissed at once. A timid girl came forward and explained that she had made the mistake quite unknowingly. This explanation was accepted.

AFTER several interviews, a non-subscriber in the South-West Lancashire district was converted to see the importance of the telephone service, but, unfortunately, owing to wayleave and other difficulties, the connection could not be made. In consequence of this, it was suggested to the gentleman in question that he should remove to another address, which he did. When it is realised that the premises vacated had only just been improved at a heavy cost, the persuasiveness of the contract officer appears all the more extraordinary.

### THE 46TH ORDINARY GENERAL MEETING OF THE NATIONAL TELEPHONE COMPANY, LIMITED.

At the meeting held on July 28, Mr. GEORGE FRANKLIN, the president, after commenting on the half-year's accounts, said:

Now, I do not think I can leave the accounts without making a short reference to the result of the adoption by the Company a few years ago of the system of payment according to user; what is commonly called the measured rate. The adoption of this method of charge caused quite a little excitement among the Associated Chambers of Commerce and other authorities, and some opposition, on the ground that the Company's scale of charges would impose a heavy burden upon those paying under the measured system. How unfounded and groundless those fears were is proved by a reference to the facts. At the present time the Company has in the provinces about 124,000 stations upon the measured rate, producing an annual average revenue of £6 4s. per station. I think it must be a boon to anyone to have a telephone at a moderate figure such as that indicates. Having so many small users is a great advantage, because the larger your telephone system becomes the greater use it is to those who are already subscribing to it.

Whilst on the subject of our critics, I might also mention that some comparisons have very recently been made as the result of the visit of the Engineer-in-Chief of the Post Office to the United States. Criticisms have been made as to the varying rate of telephone development in Great Britain and in the United States. It is pointed out, with no doubt perfect truth, that on Jan. 1 last the United States had 7·6 stations for every 100 of the population as compared with 1·3 stations in Great Britain. But what are the facts? In the United States there has been no State ownership of the telephone; there has been no ingenious decision by which the telephone has become a telegraph; there the telephone companies have an unlimited life, and instead of having municipalities always introducing obstacles in the way of their expansion, they have had, generally speaking, the greatest facilities given by such authorities. More than all, they have not had to pay a royalty of 10 per cent. upon their gross incomes, they have not had to hand over this sum of between £3,000,000 and £4,000,000, which I referred to just now. They have had practically free trade in telephones which has enabled them to develop their business to a remarkable pitch of excellence, which I venture to think we should have been able to equal, and more than equal, if we had not been from the very first hampered, cribbed, cabined and confined, first by the legal decision which made the telephone a telegraph, secondly by the conditions of the license, and thirdly by the fact that, having granted the license, the Government of the day has always appeared to desire to hamper the telephone industry in the interest of the telegraphs owned by the State. ("Hear, hear.") This large business, in which is invested £16,000,000 of capital, has been built up under the greatest

difficulties and in spite of the most vigorous efforts which have been made from time to time to stifle and smother it, and I think it is satisfactory to know that we have done so well, and that, as compared with Europe, there is only one country, viz., Germany, which beats us in the number of instruments to population. This shows how unfair it is of our critics to make a comparison under circumstances which are so entirely different. (Cheers.)

I mentioned at the last half-yearly meeting that in the absence of an agreement with the Postmaster-General as to the value of the Company's assets such value would have to be determined by arbitration, and that the Company's officers were engaged in preparing for the inventory upon which the Company's claim would be founded. Since that time the preparations have been actively proceeding, and I observe that the Postmaster-General, speaking in the House of Commons the other evening on the Post Office estimates, stated that he had very small hope that the terms could be settled otherwise than by arbitration. If this be so, as it probably is, the Board have confidence in the case which it will have to put before the arbitration tribunal, and whilst in the public interest it will always be ready to co-operate with the Postmaster-General as far as possible in arriving at an early solution of the problems to be solved, the shareholders may rest assured that the Board will strongly guard the interests committed to their care. Negotiations are at this moment proceeding having for their object the preparation of an inventory of the Company's plant, and to have this inventory and the age agreed to by the Post Office as the inventory proceeds, and, although I am not a prophet, I venture to hope that these negotiations will result in an agreement which will minimise the contentious operations as far as possible.

The task before us is a very heavy one. It was described the other day by the Postmaster-General in the same speech to which I have referred as the most gigantic industrial operation that this country will ever have known. The responsibility, therefore, upon the two parties to the operation is a very great one, involving as it does not merely the immediate future of the telephone service of the Company, but also to a large extent the happiness and comfort of the Company's staff, who have for so many years loyally and faithfully served the Company.

Before we meet again the inventory proceedings will doubtless have commenced. A staff of about 300, divided into groups, will be occupied for a period of probably more than fifteen months in trying to enumerate the plant, and in trying also to determine its age, and this inventory, when it is finished, will be the foundation of the claim to be ultimately made. I need hardly say to you that the Board will make every effort consistent with its duty to the shareholders to facilitate a settlement in as speedy and satisfactory a manner as possible.

We also want to acknowledge the great help which the Directors have from quite a remarkable staff; many of them extremely gifted, who are devoting themselves, without any regard, I was going to say, to either hours or emoluments, to a business which appears to fascinate all who touch it. The Board have the devotion of a staff, I venture to say, without parallel in any other business, and with the help of the staff in the future I believe the Board will be able when the time comes, although I am not a prophet, to satisfy you that at all events they have done their best with the property which you gave them to manage.

## ENTHUSIASM AND ENERGY.

By A. C. NICK.

Of late years the word enthusiasm has been very much to the front, and the man who is classed as an enthusiast would appear to have attained a much coveted distinction in his business or profession, but I venture to state that if the word were taken in its literal sense he would hardly be complimented by the appellation.

The true meaning of an *enthusiast* is a person who imagines that he has a special converse with the Almighty, or special communication with Him. Now I can hardly believe that there is anyone that is so filled with overweening vanity that he really believes this, although I am bound to admit that there are certain people in this world who act in such a way as to rudely shake my belief.

There is no getting away from the fact that this is the true meaning of the term, as it is derived from Greek words meaning "divinely inspired." There is however another construction put upon it, but which has no connection with the true derivation, and is "One who has a violent passion or excitement of mind." This is almost as bad as the other.

Enthusiasm in one or more persons is not an unmixed blessing. This is what Locke says about it—"Enthusiasm is founded neither on reason nor divine revelation, but rises from the conceits of a warmed or arrogant imagination." Again Ames remarks that "Faction and enthusiasm are the instruments by which popular governments are overthrown."

Enthusiasm alone is utterly unable to achieve any great object, but, on the other hand, unless checked by calm, deliberate men, may bring on great disasters to nations, or, in the case of business, large pecuniary losses.

How often do we read of political and other meetings where

the audiences have been carried away by enthusiasm, but had such meetings been correctly reported it would be found that the audiences were so overcome with hysterical emotion that they forgot they were men and women.

Take the case of all great wars. They invariably commence with great enthusiasm on the part of the nations making them, but enthusiasm never won a fight, the calm, calculating nation, unless overwhelmed by great odds, coming out the victor. The French army in 1870 was filled with great enthusiasm, and we all know how disastrously that army failed. Something more than enthusiasm was required. On the other hand, no one would call the British army at Waterloo enthusiastic. The majority of the soldiers were raw militia who had been dragged away from their homes, and who knew little of the circumstances under which they had been sent to a foreign country to fight, and yet in their half-starved condition they stood up to the hammering and gruelling like men, but not enthusiastic men. There was something in them far better than enthusiasm. It was not only courage—the French had that in 1870—but a fixed stubborn determination to win or go under fighting.

I think you will find that all the great works in the world have been carried out by strong, earnest men who could not have raised a shout if they had tried, and then look at the failures, and I think I am not wrong when I say that in nearly every case you will find an enthusiast directing the operations. It is the calm, earnest men who lead others on to success, and not the so-called enthusiasts who gets carried away with excitement and more often than not when a rot sets in whimpers and bleats that it is someone else's fault.

I have often heard certain people say, "Oh, So and so is not enthusiastic," inferring, of course, that they are themselves; but on carefully weighing the matter up their enthusiasm appears to chiefly consist of getting out of their fair share of work and taking the credit themselves of anything well done, which is justly due to their subordinates. They also appear to derive a fiendish joy from the downfall of a comrade. They are neither divinely inspired, strong, nor determined, but only shirkers.

Coupled with enthusiasm we generally find the term energetic applied to certain individuals, who from the first are obviously not entitled to it, their proper name should be blusterers.

How many people are there who are said to be energetic simply because they put most of their time in rushing about trying to impress their superiors with their vast importance. It is energy of a sort I will admit, but it is not to be compared to the energy of a man who sticks to his work all day, and although to outward appearance he does not appear to be of an active disposition, he will at the end of the day have expended more productive energy both manually and mentally than the rushabout. He is by far the most energetic of the two, and yet if a judge of character (commend me to a so-called judge of character for making more mistakes in summing up a man in a given time than any other person) were to give an opinion on him he would place him amongst the steady-going plodders. A more insulting expression could hardly be applied to one who devotes the whole energies of his mind and strength to his employer's business. A man with an energetic mind is rarely of an active disposition, which most of the world's great thinkers prove.

Energy means great strength, either of mind or muscle, and therefore a man engaged in laborious work is energetic, but he will most likely be called a plodder, and the man who is engaged in great mental problems, or in scientific discovery, is also energetic, but he most likely will earn the title of crank, or dreamer, but the blusterer rushing about with his hands full of paper and not enough ears to put his pens and various coloured pencils at the back of, will, without the slightest doubt, be considered a most promising and energetic person. His energy is the energy of a warped intellect.

A manager for a large company once remarked to me "What is wanted in this world is a school of honour, where men who require it can be taught, before going out into the world, how to act in a straightforward and manly way, both to their superiors and inferiors, and to scorn all underhand and shady actions." If such a thing could be there would be no necessity to use such adjectives as "energetic" and "enthusiastic" to certain individuals, as all would then do their utmost for their employers and this being so, all would be making the most of their energies and all would be, if I can make use of such an expression, divinely inspired.

## THE CORRESPONDENCE CLERK.

By A. H. HUDSON, *Metropolitan Office.*

THE correspondence clerk occupies a somewhat isolated position in our offices. He takes no part in dealing with the ubiquitous works order in its routine through the various departments, cash books do not trouble him, and he keeps no returns. He is misunderstood by the majority of the rank and file, the general idea amongst the uninitiated, formed on an incorrect basis, being that his work is easy and almost anyone could do it. Of course, this is entirely wrong, as persons holding such views would find were they to be transferred to correspondence work for a short while. To quote a recent writer in this JOURNAL: "The work requires tact, courtesy, firmness, a capacity for sifting wheat from chaff, and some knowledge of human nature." Unfortunately in the past this was not recognised to the extent it is now, and instead of a clerk already to some extent experienced being put on to the work when a vacancy occurred, it was not at all uncommon for an entirely new man to be brought into the service. From this fact was formed the incorrect notion already referred to, the idea not unnaturally being that if a new and inexperienced man could do it, anyone could. I remember one case where a new man was put on to the work, as a junior, whose only qualification was that of being an army reserve man, and the remarks of the register clerks, when he carefully wetted his lead pencil when making notes in the registers were not to be found in any service instruction, especially as strong pressure was applied to the pencil. Fortunately he did not stop long on the work, and for awhile after he made a satisfactory doorkeeper. His notes in the registers, however, remained long after his removal as a memorial of his conscientious work.

The youth deputed to correspondence work should of all things know shorthand well. In the early stages of his training he will find it an advantage to draft out his letters before dictating them to a typist, and, with shorthand at his disposal, this can be done quickly. He would also find it useful for the purpose of taking notes of points suggested to him when he is referring a letter for advice, and in many other ways find it a great convenience. Therefore I say that all correspondence clerks in the service should be able to write shorthand at a fair speed and be able to read it easily. A youth who has already had experience in typing or writing letters from dictation, has an advantage in that he has absorbed a fair amount of knowledge as to how a letter should be written. When starting on his career he should be taught how to fasten papers together correctly and neatly (this is a lost art in some offices in the service) and how to file them so that they may be found quickly when required. Nothing is more irritating to a manager or chief clerk than, when wanting papers, to be kept waiting for them.

With regard to filing, we have here a system of keeping the current papers in Amberg files each marked with a letter of the alphabet. Each batch of papers before being put away is marked in the top left-hand corner with a date, thus—24—signifying that the batch would not be required again until May 24, unless anything happens in the meanwhile. Each day the junior correspondent goes through the files and extracts those bearing the current day's date, at the same time putting away those dealt with on the previous day. In this way each paper gets turned out of the files in due course, but an occasional supervisory inspection is made to see that none has been overlooked.

In course of time our junior obtains a good knowledge of the Company's books owing to his continual reference to them for information in dealing with the letters handed to him. In his junior stage, of course, he does but little dictation, his duties being the obtaining of necessary information for his seniors. As, however, he sees most of the letters and the replies, he is gradually becoming more and more experienced and ultimately will fit himself for actual correspondence when a vacancy arises.

Then he becomes a full-fledged correspondence clerk, but he still has a lot before him and his troubles are only beginning. Like a boy leaving school his real education is commencing. It is true that to some men it is an easy task to put together a letter, fluent, correct and above criticism, but these men are not always to be found. Our correspondent, moreover, has to work to some extent

under difficulties, as it is assumed that it is necessary he should be in the general office where all the noise and bustle is going on. Not for him is the quiet private office where he can collect his thoughts and dictate his letters in peace. Telephones are fitted all around him and are in constant use. Register clerks are checking over cash very audibly, and fragments of conversations over the three or four telephones all within hearing disturb him. Then there is another source of trouble. As is known, in many of our offices the dictation of letters is done by telephone, and it is no unusual thing on the part of the office staff to interrupt the correspondence clerk when he is in process of dictating. These queries are often of the most simple nature, but any protest on the part of the correspondence clerk deeply offends the querist who cannot be convinced that a few minutes later would probably not have mattered. It is this same sort of person who will go to another clerk and interrupt him in the casting of a long line of figures, or stand by in sight of the cashier with such mute pathos written on his or her face as to effectually prevent the adding of any figures correctly, except by a person of iron nerve.

A further difficulty which faces the correspondence clerk is the necessity for dictating early if he would avoid stopping late. All letters must, as far as possible, be answered the same day as received. The typists work up to the same time for leaving as the general office clerks, and, therefore, if the correspondent does not wish his letters included in the batch which is being completed at closing time, he must dictate his letters as early as possible, but he must not hurry, as directly a correspondent hurries he may look for trouble. He is apt to miss some portion of the routine laid down in matters pertaining to correspondence. It has for a long time been my opinion that the typists in a large office should, half an hour before closing time, cease dating letters for that day, the balance being dated for the next day and signed in the morning. The small delay in answering the letters would not matter much, and the official who has to sign the various letters, memorandums and notices would have more time to check them without having to stay after the usual office hours.

Our correspondent has to deal, at any rate in London, with all sorts and conditions of subscribers, from a duke down to a fried fish dealer, and, therefore, must be in a position to write accordingly. He must be well up in the etiquette of addressing titled persons, and keep an eye on the typist who will commence a letter "My lord" and end up "Yours truly." He must not make the mistake that one clerk did who, on answering a telephone, was told that the "Earl ——" was speaking. The clerk was most careful to be correct in his speech, only to find to his disgust at the finish of the conversation that the person at the other end was the landlord of a public-house.

Our correspondent is told to answer as many letters as possible by telephone, and, conscientiously, he tries to do so. He has, perhaps, some successes at first, probably when the chief clerk is looking on—things generally happen that way—but altogether he gets disheartened. He quite appreciates that the Company are out to induce the public to make use of the telephone service, and that therefore the Company's staff of all people should believe in the telephone. But he does find it hard after taking perhaps ten to fifteen minutes explaining to a subscriber to be asked "Well, you might confirm it in writing," and thus all his time, he feels, has been wasted and his other work delayed. Of course the time has not always been wasted, as some subscribers appreciate the attention. The private house subscriber in London, however, is hopeless for this practice. One only gets the butler, or a boy, or a maid who knows nothing, and the master or mistress is out, so the correspondent feels it is useless leaving a message, which might be forgotten, and writes his letter after all. In these attempts he also comes across the subscriber who appears to feel that the Company, in trying to reply by telephone to his letter, is afraid to put in black and white the explanation of his poser. You can almost feel the warmth of his indignation at being troubled by telephone when he says, not always politely, that he requires an answer in writing.

Our correspondent does not handle money, but he has his temptations when subscribers sometimes offer a small inducement to leave the line working for a while, but these offers are not often made. It is not at all unusual, however, for a subscriber, grateful for attentions shown, to suggest that the clerk shall go round and





THE NATIONAL TELEPHONE OPERATORS' SOCIETY AND CLUB, GLASGOW. PAST AND PRESENT MEMBERS OF COMMITTEE, SESSIONS 1907-8 TO 1910-11.

receive something in kind. I have at different times had a hat, a pair of boots, and something in the hosiery line offered me if I cared to pay a visit.

Our correspondent in course of time finds that most of his troubles are on account of subscribers who are notoriously backward in payment, and he has to keep his eyes well on these gentry. It is this sort of subscriber who waits until the last day of the final notice has expired before finding that his telephone has been out of order for months, or that three years ago he was promised something or other by the contract officer which he has never had; that the contract officer promised him he need not pay for three months; that the instrument is not fixed as he wanted it, etc. He *always* considers it "disgraceful, but only to be expected from a monopolist Company." Of course it is only to be expected that subscribers soon find out our routine, and delay payment until the last day.

The subscriber who says he is a shareholder arrives in due course, and also the one who says he is a friend of someone or other, and who endeavours to frighten our clerk into giving way on some point.

When our correspondent has been through all these experiences he begins to feel how important a part he fills in the service. He understands that when he is writing or speaking to a subscriber it is the Company who is writing or speaking, and not his personal self.

This renders him careful of what he says for fear he should compromise the Company. He gets to know the subscribers in his district (with some he gets quite friendly), and generally acquires a knowledge of human nature as placed on paper. He does his best for the Company, and if he does not always succeed—why, who does?

#### THE NATIONAL TELEPHONE OPERATORS' SOCIETY AND CLUB, GLASGOW.

We publish in this month's issue a photographic group of the past and present members of the committee of "The National Telephone Operators' Society and Club, Glasgow." This organisation has successfully completed its third session, and the fourth session is being anticipated with the liveliest interest. As its name implies, it combines education with enjoyment. The first hour of the programme is set apart for the reading and discussing of papers on telephone or other subjects of an educational nature, and the remaining hour and a half is taken up by the club meeting.

During the club part of the meeting, cards, games, songs, instrumental selections, readings, sketches, and dancing are indulged in. Needless to say the club programme is much enjoyed, and the dancing is participated in with much spirit.

It is not too much to say that the society and club are responsible for the spirit of friendliness and co-operation pertaining amongst the staff in the various exchanges, which prior to the inauguration of the society and club did not to the same extent exist.

## ELECTRIC CLOCKS.

By J. H. STEWART, *Gerrard Street.*

Now that electric clocks form part of the equipment at so many of our modern exchanges, and are fitted and maintained by the electrical staff, a description of some of the systems in common use may interest our readers.

Some remarks upon the properties of the pendulum are also included, for whether a clock be electrically impelled, key-wound, or otherwise driven, it is upon the pendulum or spring balance that its performance as a timekeeper depends.

Electric clocks may be grouped into two distinct classes:—

(1) Those that are self-contained, being often ordinary clocks which are wound up electrically through the medium of a motor which is brought into action when the spring runs down. (2) Those in which a set of dials is driven from a master clock. This latter class may be further divided into those in which the master clock is key-wound and merely used to send out current impulses to actuate the dials, and those in which the master clock itself is electrically driven.

Sometimes synchronised clocks are classed as electric, but, they are usually key-wound clocks, timed at intervals (usually hourly) by an electric impulse from a master clock, and are not electric clocks as usually understood.

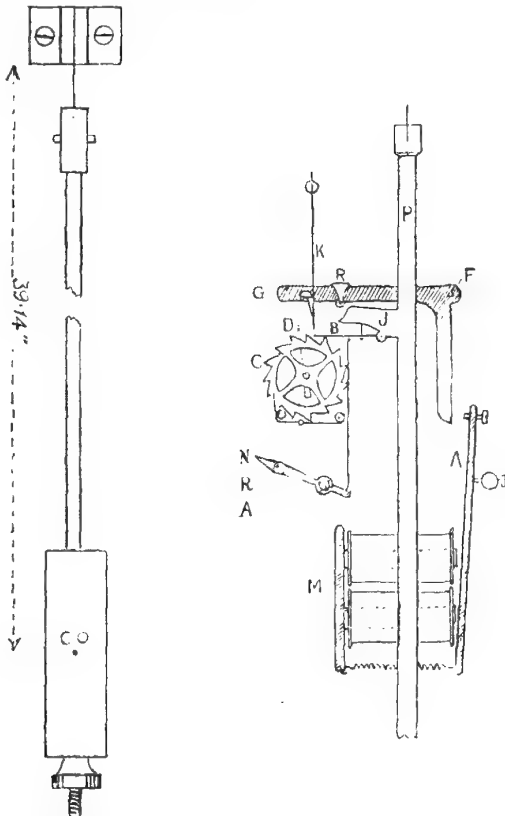


FIG. 1.

Attempts to drive clocks electrically date back almost to the discovery of the electro-magnet and it is somewhat surprising, and, to those interested in electrical science, a matter for regret that progress in this branch of applied electricity has been so slow.

There have been several contributory causes to this want of progress; (1) the difficulty of making transient electric contacts at once light and reliable; (2) the difficulty of causing the pendulum

to make these contacts without interfering with its timekeeping properties, (3) the difficulty of making a suitable step-by-step motion for the dials, and (4) the prodigal waste of electrical energy in some of the earlier systems.

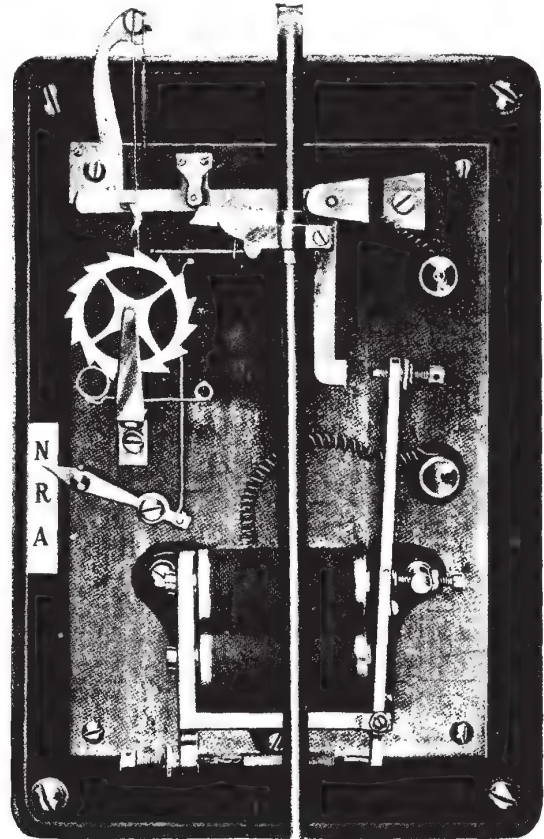


FIG. 2.

Only a few systems now in common use will be referred to here, but first a few simple facts relating to the pendulum will be considered.

**The Pendulum.**—A simple pendulum consists of a suspended cord or rod, with a bob attached to the free end; the rod is theoretically supposed to be without weight and the mass of the weight itself to be concentrated at its centre. If such a pendulum be set swinging and allowed to come gradually to rest it will be found that though the arc of swing gradually diminishes, the time of each swing, if not too large, remains constant. This important property is sometimes called the pendulum law. Since the theoretical pendulum defined above cannot be realised in practice, it is necessary to know how the practical pendulum differs from it. The shorter a pendulum, the more quickly it swings, and each particle of the solid rod tends to swing in different times; but obviously all must swing together, so that a sort of compromise takes place between the different tendencies, and the whole rod swings as if its material were collected together at one dense spot which is known as the centre of oscillation. Thus a solid pendulum swings as an ideal pendulum would do which was equal in length to the distance between the centres of suspension and oscillation.

The next important thing to note is that the time of swing is governed solely by the length, and not by the weight of the bob, nor the material of which it is composed; a bob might be made of iron, brass or wood, and its weight might be halved or doubled, but provided the length remains constant the time of swing will not alter. A pendulum bob acts like a falling weight, and a little consideration will show that the time bodies take to fall under the action of gravity is independent of the weight; a falling 2-lb. weight is only equivalent to two 1-lb. weights falling side by side.

A pendulum is only isochronous when swinging through very small arcs; the reasons cannot be explained within the compass of



this article, but the fact was well known to the early horologists, and a great step in advance was made when Dr. Hooke invented the anchor escapement, which permitted of the pendulum swinging through quite a small arc. Anchor escapements are to be found in many grandfather clocks at the present day, and it will be noticed that any good seconds pendulum never swings more than two or three degrees on each side of the perpendicular.

In the earliest clock escapements to which the pendulum was applied it was necessary for it to swing through a very large arc before the pallets could release the teeth of the escape wheel, and this large arc of swing greatly impaired the timekeeping.

When very accurate time is required the pendulum must be "compensated" for changes of temperature. All substances expand or contract with an increase or decrease of temperature; a pendulum will therefore increase in length in hot weather and swing more slowly, and the clock it is controlling will lose time, unless means are taken to counteract this tendency.

Advantage is taken of the varying rates of expansion of different substances to accomplish this end, and when a pendulum is so constructed that its time of swing is unaffected by temperature changes it is said to be compensated.

Only a very simple compensation can be described here; it depends upon the different rates of expansion of wood and lead. The "co-efficient of expansion" of lead is nearly six and a half times that of wood, and this being known it is easy to calculate that a cylindrical lead bob of about 13 inches in length will compensate with a wood rod with a total length of about 46 inches. The lead weight rests on a flange and nut on the end of the rod (see Fig. 1), with a rise in temperature the rod will lengthen, and the lead weight is consequently lowered, but the weight itself expands, the expansion taking place in an upward direction, thus maintaining the centre of oscillation (which is about the point c.o. in the figure) at the same distance from the point of suspension as before; the time of swing is therefore unaltered. With a decrease of temperature these actions are reversed, the pendulum rod shortens, and the weight is raised, the lead cylinder contracts, lowering the c.o. just as much as the shortening of the rod had raised it, and again no change will occur in the time of swing.

As the electric clock systems adopted by the Company fall under the heading of Class 2, with an electrically impelled pendulum, this form will be described in greater detail than the other types referred to in this article.

The dials and the pendulum controlling them are all connected in series, and there is only one contact point in the whole system—viz., that on the pendulum, or time-switch, as it is often called, because its function is to switch the current that actuates the dials on and off at certain definite intervals—usually half-minute ones. The Synchronome Company's system may be taken as typical, the installations at Head Office and Salisbury House being on this plan. The action of the pendulum will be made clear with the aid of Figs. 2 and 3. The pendulum rod, P, swings seconds, the bob at the lower end not being shown in the figure; its motion is maintained by the weighted lever moving about the point F, being allowed to fall upon the cam shaped projection J every 30 seconds. Each time the pendulum swings to the right a light hook B engages with the ratchet wheel and moves it forward one tooth. As the wheel contains fifteen teeth it turns round once every half-minute. The projection D, fixed immovably to the same arbor, is also carried round with it, and in passing under the spring catch K, presses it to the right, thus releasing the weighted lever. The roller R, falls upon the sloping end of the cam J, giving an impulse to the pendulum. The motion of the lever is arrested by the contact on the armature A; the instant this contact is made, a circuit is completed through the magnet M, and all the dials in series with it; the armature A is pulled up, flicking the lever G on to the catch K, again.

The impulse given to the pendulum is sufficiently powerful to keep it swinging freely for the next half-minute when the cycle of operations is repeated. The positions of the cam and lever are so adjusted that the impulse is given through an arc which is bisected by the middle point of the swing; this is of considerable importance, as the impulse causes least disturbance to the free action of the pendulum when so delivered, an advantage not realised in an ordinary clock.

(To be continued.)

## CORRESPONDENCE.

### THE LOAD LINE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

In reading Mr. Deane's excellent paper on the above subject, may I trespass on your valuable space with a question?

In the July number does table (c) represent junction values to one exchange, or to all sub-exchanges connected to a main exchange?

If the latter condition, how would you account for the following:—

(a) Exchanges with ten outgoing junctions to one sub-exchange junction, value 2.2.

(b) Additional sub-exchange added also having ten outgoing junctions, junction value for eleven to twenty outgoing junctions, 2.1.

Why should the value of the junctions leading to the first sub-exchange be reduced in value by condition (b) being added?

Leicester.

F. V. SANSONE.

### TELEPHONE INSTALLATION FOR THE BRITISH ANTARCTIC EXPEDITION.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

In Mr. Cohen's article in the August JOURNAL it is stated that two of the telephone instruments will be used in connection with observations of the Aurora Borealis.

As the expedition is to the southern hemisphere, might I ask if the meteoric phenomenon to be observed there is not termed the Aurora Australis?

I know very little of the science, but should like to have the ground work of that little as accurate as possible.

Glasgow, Aug. 11.

JNO. A. CRAVEN.

[Aurora Borealis was, of course, a slip of the pen. It is the Aurora Australis, as Mr. Craven suggests, which is observable in the Antarctic.—Ed. "N. T. J."]

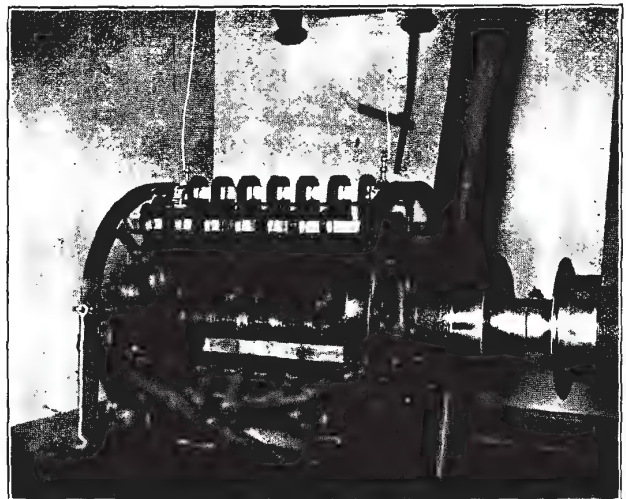
### SOUTH FORELAND LIGHTHOUSE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

The enclosed photograph may be of sufficient interest for the JOURNAL.

It is one of the four dynamos used for lighting the South Foreland Lighthouse, and from its history and construction, is somewhat out of the common. I understand, on good authority, these machines were working in Paris during the siege, and it will be noticed their construction is peculiar, as they are built of batteries of permanent magnets and are driven by belting (through counter shafting overhead) from low pressure, old type, horizontal engines of considerable size.

I, unfortunately could not see the engineer-in charge at the time of my visit, and the lighthouse keeper was unable to give me much electrical data, but, I understand, the lamps burn at 50 volts, which, from indications about, appears to be transformed down.



The arc lamps are also of an old but very effective type, burning a special carbon which gives a yellowish white, or in sea parlance, a "bright light," this being found in practice to be of greater fog penetrating power than the ordinary violet arc light.

The lantern is a revolving sixteen lens one, giving a flash every two and a half seconds in any direction, and, as it is 360 feet above sea level it is visible at a distance of 20 miles in clear weather.

If any of the staff are visiting Dover—which I may say in passing, is as interesting a place as any to be found in the country, either for a botanist, photographer, or engineer—it would be well worth their while to walk along the cliffs to the lighthouse, about three miles, some of it stiff climbing, especially if the Eastern Cliff route is taken, a magnificent view is to be had all the way, and from the lighthouse tower, a clear day shows the coast from Shakespear Cliff to Ramsgate, and also the French coast, the tower of Cape Grisnez Lighthouse being distinctly visible.



The lighthouse keepers are most obliging men, and will show anyone over during daylight on weekdays.

For a maintenance electrician or engineer, the whole place is a model example, as buildings, machinery, and lamps are kept in perfect condition, from the massive iron lens carrier—riding in its bath of mercury, so lightly poised that it can be moved with one finger—down to the telescope rack, everything is spotless and polished to the highest degree.

As a hint to visitors to any lighthouse or lightship, if you have some good readable books or magazines you do not need again, take them with you and forget them—they will give a lot of pleasure on long winter nights.

Dover, July 19.

J. STUART BEST, Engineer

### LONDON NOTES.

MR. A. R. MACFARLANE, who was recently appointed Local Engineer, Walthamstow, was presented with a set of pipes by his *colleagues* on the electrical staff. Mr. Greenham made the presentation, and referred to the good work which Mr. MacFarlane had accomplished whilst in the Construction and Fitting Department.

THERE have been three wedding presentations recently to members of the Salisbury House staff. Miss L. Harkness, Clerk, Rentals Department, was presented with table linen; Miss E. Emerson, Clerk, Fees Department, with a clock; and Mr. R. Humphrey, Chief Clerk, City Divisional Engineer's office, with an overmantle, together with a gold brooch for Mrs. Humphrey. This year has been quite exceptional for weddings amongst the staff, and one or two others are likely to take place before the end of the year.

THE City contract office has just had an original reason given by a subscriber for not having his number changed to permit of auxiliary working. The number is 1857, and as that was the year of the Indian Mutiny, he could not think of allowing it to be altered. One wonders whether the desire is to lessen the difficulty of remembering the telephone number, or an easy way of arriving at the date of the Mutiny.

MISS G. HEARD, of the Metropolitan Correspondence office, has just obtained a senior certificate for shorthand from the London Chamber of Commerce, and an intermediate certificate from the Society of Arts. Miss Heard is to be congratulated on her double triumph.

THE time for Telephone Society's opening announcements has again come round. As the Company has repeated its generous offer of last year to award five premiums of £7 each, and five of £3 each, for papers read before telephone societies throughout the country, the London Society is setting aside five of its meetings for hearing the papers to be selected by the papers committee from competitors on the Metropolitan staff. It is to be hoped that the response from the staff will be adequate and encouraging. The opening meeting of the session will be in the Great Hall, Salisbury House, on Monday, Oct. 3, when Mr. Eustace Hare, the president, will deliver his presidential address. Mr. Hare's subject, "Papers, their Writers and Audiences," is a very happy one for an opening meeting, and there ought to be a record attendance. Although on such an occasion discussion is not usual, it has wisely been arranged that as full opportunity will be afforded of discussing and criticising the president's views, as is the case with the ordinary papers. As everybody generally knows how to write other people's papers, the discussion ought to possess both interest and animation. In addition to a big meeting on the first night, the committee also appeal for a big membership list. The subscription is only *od.* for ladies and *1s. 6d.* for gentlemen; the fees therefore cannot keep many back.

THE Operators' Society has also issued its preliminary announcement. In asking for volunteer paper-writers, the committee has introduced a commendable innovation by giving sixteen suggested subjects on which papers might be written. The choice is varied, and several of the topics strike one as being just those on which a great deal could with advantage be said. If the response is at all keen, the society has a good time in front of it.

THE striking effects of the season on the traffic at our exchanges is at no time better exemplified than in the month of August, when everybody is said to be "out of town." The reduction is naturally most evident in the West End, where practically all the large private houses are closed. At one West End exchange, there was a falling off of no less than 36 per cent. in the calling rate, as compared with the previous month, while the average drop for the three largest West End exchanges was 26 per cent. The City also suffers, but not to the same extent, as someone must keep business matters going while the principals are holidaying; one busy City exchange, however, shows a drop of 16.7 per cent., and another has decreased by 12 per cent. Such conditions help to pile up the organisation troubles and victories of the traffic staff.

### POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

THE following papers read before the above institution are now on sale at the prices mentioned:

"Alternating Current Measurements," by A. G. Lee, B.Sc., A.M.I.E.E.	<i>od.</i>
"Erection and Maintenance of Post Office Secondary Cells," by W. J. Medlyn .. .. .	<i>6d.</i>
"The Loading of Telephone Cable Circuits," by A. W. Martin, A.M.I.E.E.	<i>1s.</i>

Application for copies should be made with remittance to the Engineer-in-Chief, Head Office.

### GLASGOW NOTES.

THE Glasgow National Telephone Bowling Club gives indications of becoming a power in the local bowling world. The club's record is a good one, and other results of the two most recent matches do not detract therefrom. The first of these was played on the green of the Pollokshields Club on Aug. 6, when representatives of the Edinburgh staff were defeated by 33 shots. This seems to compensate for the victory obtained by the eastern men in Edinburgh on a former occasion. The second victory was obtained over the Crosshill Victoria Bowling Club in a game of four rinks a side. The Victoria were defeated by thirteen shots, this being one of the very few defeats sustained by them this season.

THE autumn meeting of the Bell Golf Club was held at Carnynte on Aug. 6, when the prize winners were Messrs. D. B. Heberton and J. F. Murray.

ALL the competitors have pleasant recollections of the golf match between representatives of the Eastern and Western Scottish districts which took place at Hamilton in June, and the return match is being anticipated with pleasure. It has now been arranged that this will take place on Saturday, Sept. 10, at Bathgate, and the home team will no doubt then endeavour to take their revenge.

THE change-over to the new Central Post Office Exchange took place on Aug. 13, and as intercommunication had to be given between National and Post Office subscribers the necessary joint arrangements were made. The transfer was one of some magnitude, some 6,000 subscribers being involved, and the work was carried through successfully.

INVENTORY of plant is in the air, and it is anticipated that in common with the rest of the country an early start will be made with this gigantic undertaking.

WE regret to announce the death of Mr. Thomas Napier, Exchange Inspector in this district. Full details have not yet been received, but his death was very sudden, taking place on Aug. 6, the date on which his annual leave terminated. The sympathy of the staff is with those who now mourn his loss.

### RETIREMENT OF MR. THOS. DONALDSON.

AN interesting function took place in the Glasgow district office on the evening of Thursday, Aug. 18, when, on the occasion of his retiring from the Company's service, Mr. Thomas Donaldson, Chief Mechanic, was presented with a purse of sovereigns, and an umbrella for Mrs. Donaldson.

MR. Valentine made the presentation, and in the course of his remarks referred to Mr. Donaldson's long period of service which was characterised by work well done in a most unobtrusive fashion. He also referred to the large number of telephone men now scattered over the country who served their period of apprenticeship under Mr. Donaldson, and in the name of all the subscribers he expressed the wish that Mr. Donaldson would be long spared to experience the benefits of the Company's Staff Pension Fund, in which he would now participate. A communication from Mr. F. Douglas Watson expressing regret at his absence, and conveying his good wishes was read to the meeting. In a short speech in which he recalled a few incidents of 25 years ago, Mr. Donaldson made suitable acknowledgment.

MR. Donaldson retires on his having reached the age of 65 years, and he has been connected with the electrical industry practically all his life. As a youth he served six years' apprenticeship as a brass finisher, and shortly after the expiry of his time he entered the employment of Miles & Company, telegraph engineers and contractors, of Edinburgh and Leith, who did a considerable amount of work for the Telegraph Department of the North British Railway Company. After Miles & Company retired from business, he entered the service of the railway company under the late Mr. Edward Gilbert, who some few years thereafter was appointed General Superintendent of Telegraphs to the Imperial Japanese Government. At Mr. Gilbert's request, Mr. Donaldson, along with five others, among whom was Mr. Dane Sinclair, went out to Japan and served in Tokio for a term of three years.

MR. Donaldson came home about the middle of the year 1870, when he joined the service of the Glasgow and South-Western Railway Company in Glasgow as Mechanic. In January, 1884, he left this service for that of the National Telephone Company, and since then he has occupied the position of Chief Mechanic. The mechanics' shop does not provide much scope perhaps for heroics, but it has a reputation for good work quietly performed, and many now occupying responsible positions in the Company's service must look back with pleasure to the place where they acquired the knack of handling their tools, and will join with us in hoping that Mr. Donaldson will yet have many years in which to enjoy his well-earned leisure.

### RATE REFORM IN AUSTRALIA.

THE abolition of the flat rate and substitution of a toll rate in Australia which has been under consideration for a long time will take place on Sept. 1 next. The following details of the new system are taken from the *Brisbane Courier*:

The Postmaster-General to-day (July 6) announced the Government's policy regarding the telephone system. The flat rate system is to be abolished on Sept. 1 next, and the toll system, with no free calls, is to be substituted. The new rates will be similar to those introduced when Mr. Thomas was Postmaster-General last year, and the operation of which was suspended by Sir John Quick,

**Edinburgh.**—The staff held another of the series of rambles on Aug. 6. The route was by way of Aberdour to Burntisland. The incidence of holidays and a wet afternoon prevented a large number from joining in it.

**Hull**—On Aug. 6 a party numbering about 41 of the Hull staff, journeyed to Filey for a half-day's outing. A substantial tea was provided at Foord's Hotel. After tea some of the party indulged in a very pleasant and bracing walk on the cliff top, whilst others watched some sports which were being held

**Bradford.**—City and Guilds of London Institute: Ordinary grade, first class, P. Dilger and H. Shaw; second class, H. Birkby, J. Fitton, F. Swift.

P. Wadsworth and A. E. Wills. Honours grade, first class, F. Bastow, £3 (pewterers) and silver medal, and H. Shaw; second class, H. Birkby.

**Belfast.**—City and Guilds of London Institute: Honours grade, second class, J. F. McDonald. Ordinary grade, W. S. Keown and W. H. Wood. Teacher, A. R. Pulford, Chief Inspector.

**Bristol.**—City and Guilds 1910 examination in telephony: Honours grade, first class, J. E. G. Burt, Weston-super-Mare, C. E. Morgan, Weston-super-Mare, and H. W. Read, Bristol. Ordinary grade, first class, F. J. Head, Bristol, and A. E. Sims; second class, J. H. Bannister, Bristol, F. G. Drew, Bristol, and H. W. Woodland, Bristol.

**Nottingham.**—The following certificates have been obtained in the City and Guilds Telephony Examination, 1910:—Ordinary, first class: F. Hopps. Second class: W. C. Twigg, G. E. Green. Honours, second class: A. W. Barnsdale, G. H. Carrier.

### NEWS OF THE STAFF.

Mr. W. T. LEEING, Local Manager, Ashton-under-Lyne, upon his transfer to a similar position at Bury, in the Bolton district, was presented by the Ashton staff, and colleagues in the S.E. Lancs. district, with a handsome pair of silver flower vases, suitably inscribed. The presentation was made by the District Manager, Mr. A. Pugh, who assured the recipient of the best wishes of the contributors.

Mr. J. BOLTON, Senior Inspector, Kendal, has been promoted to the position of Local Manager at Whitehaven. Mr. Bolton has been in the service since January, 1897, and before going to Kendal was at Warrington and Wigan. On leaving Kendal he was presented by Mr. Weatherburn, Local Manager, on behalf of the staff, with a case of razors, a fountain pen, and a trousers press.

Mr. J. E. G. BURT, Assistant Engineer, Weston-super-Mare centre, Bristol district, has recently obtained the Bachelor of Science Degree (B.Sc.) in Engineering of the University of Bristol. Mr. Burt deserves very hearty congratulations on his success. He is the only member of the Company's staff in the Bristol district to obtain such a distinction. He has also recently obtained the highest possible success in telephony, viz., first class certificate, honours course. In addition to this he has an aggregate of well over 90 per cent. of the full marks for all the Company's Correspondence Courses.

Mr. H. J. HERINK, Chief Inspector, Cambridge, who has resigned the Company's service to take up an appointment with the United River Plate Telephone Company, Limited, Buenos Ayres, was, on leaving, presented with a pocket letter wallet and fountain pen as representing the good wishes of the whole of the staff. The presentation was made by Mr. F. Summarsell, Local Manager.

Mr. H. M. COWLES, Exchange Inspector, Norwich, has been promoted to the position of Chief Inspector, Yarmouth. Before leaving Norwich he was presented with a handsome clock as a token of the appreciation and good wishes of his friends and colleagues of the Norwich staff. The presentation was made by Mr. H. H. Wigg, Local Manager.

Mr. A. J. STROULGER, Instrument Inspector, has been promoted to the position of Exchange Inspector, Norwich.

Mr. C. E. MORGAN, Local Manager, Weston-super-Mare, has also been appointed for the fourth successive year as the Lecturer on Telephony at the Bristol Merchant Venturers' Technical College.

Miss VINNIE JOHNSON, Operator, Henfield, has been transferred to Steyning Exchange.

Miss GLADYS HUNTABLE, Operator, Hove, has been promoted to be Supervisor at Brighton Exchange.

Miss WINIFRED M. HAMMOND, Correspondence Clerk, Brighton, has been transferred to Ipswich in a similar capacity.

Mr. F. WARE, Exchange Inspector, Brighton, has been transferred to Norwich as Test Clerk.

Miss ELSIE CLARKE, Operator at Portslade, has resigned and gone to Canada. She was presented with a travelling bag.

Mr. H. BROWN, Traffic Department Clerk, Birmingham, resigned on July 21, after three years' service, to go to America. He was presented with a Gladstone bag on behalf of the members of the traffic staff by Mr. C. W. Piggott, Traffic Manager.

Mr. J. CARTER, Test Clerk, Midland, has been appointed Clerk to the Traffic Department vice Mr. Brown resigned.

Miss E. HOLLOWAY, Night Operator at Central Exchange, Birmingham, resigned on July 1 after four years' service on account of ill-health.

Mr. H. M. THOMAS, of the Cardiff district office, who was recently transferred to Bristol as Collector, has been presented by the Cardiff district office staff with a silver cigarette case. The presentation was made by Mr. W. H. Kirk, Chief Clerk.

Mr. J. HAMMOND, Faultsman, Pontypridd, has been appointed as Storekeeper in the same centre.

Miss BYROM has been obliged to resign her position as Senior Operator at the Leeds Central Exchange owing to ill-health. She has been in the service for over ten years at Leeds.

Foreman HOOD and Mrs. HOOD, late Caretakers at the Company's Colne Exchange, who left the Company's service and emigrated to Australia principally for reasons of health, were presented with a kit-bag and a brush and comb respectively.

Miss EDITH BLANCHE MAW, who has served twelve years with the Company, has been promoted from Chief Operator to be Clerk-in-Charge, Scarborough.

Mr. DUNCAN D. PROUDFOOT, Instrument Fitter, Scarborough, has been promoted to be Inspector.

Miss GERTRUDE A. CRAMPTON, Operator at Tonbridge Exchange, resigned on July 28. She was presented by the staff with a dressing-table set as a token of esteem.

Miss M. ROWLAND, Operator, Plymouth, resigned from the Plymouth staff on account of ill-health. A picnic was held on July 9, when she was presented

with a gold bangle, which was contributed to by all members of the various departments as a token of regard.

Miss WINIFRED LUCY TURBITT, Operator, Plymouth, was presented with a silver shoe lift and button hook in case on her resigning from the service.

Miss ALICE GRAHAM, Chief Operator, Barrow Exchange, left the Company's service on Aug. 11 to take up a position with a private firm in Carlisle. She entered the Company's service as a half-time Operator in June, 1904, at the Carlisle Exchange, and was promoted to the position of Chief Operator at the Barrow Exchange in October, 1907. The District Manager (Mr. Taylor) presented her with a gold brooch set with pearls and turquoise, and expressed the good wishes of the staff for her future welfare.

Mr. F. W. WATSON, Learner, Swansea, has been promoted to be Sub-Engineer.

Miss M. M. RHODES, of the Manchester district, has been promoted from Operator to be Chief Operator at the Higher Broughton Exchange. Miss Rhodes entered the service in July, 1902.

### METROPOLITAN STAFF CHANGES.

Mr. HAROLD BENNETT, Apprentice, has been appointed Engineer on probation.

Mr. W. E. WOODCOCK, Inspector, Bromley, has been appointed Assistant Night Manager.

Mr. L. E. WORTHY, Assistant Engineer, has been transferred from Lee Green to South (Sydenham).

### Traffic Department.—Promotions and Transfers:

Miss EDITH TRINGHAM, Senior Supervisor, Paddington, promoted to be Senior Supervisor-in-Charge, Hammersmith.

Miss ROSINA WHITE, Operator, Lee Green, promoted to be Supervisor-in-Charge, Sidcup.

Miss AMELIA TOLLETT, Operator, Westminster, promoted to be Supervisor, Avenue. She was presented by the Westminster staff on leaving that exchange with a silver-backed hand mirror.

Miss ADA FISK, Operator, North, promoted to be Supervisor, Paddington.

Miss MILLICENT KILBURN, Operator, Avenue, promoted to be Supervisor, London Wall.

Miss SYLVIA EARLE, Operator, London Wall, promoted to be Supervisor, Holborn.

Miss ANNIE IDDEN, Operator, Holborn, promoted to be Supervisor, Battersea.

Miss ELIZABETH CLANFIELD, Supervisor, transferred to a similar position at Brixton.

Miss ETHEL SOWERBY, Supervisor, School, transferred as Supervisor to Gerrard.

Mr. ERNEST FLOWER promoted from Night Clerk-in-Charge, Gerrard, to Assistant Night Manager.

Mr. WILLIAM NEGUS promoted from Night Clerk-in-Charge, Hop, to a similar position at Gerrard.

Mr. THOMAS CAMPBELL promoted from Night Operator-in-Charge, Holborn, to be Night Clerk-in-Charge, Hop.

Mr. HERBERT FRENCH promoted from Night Operator, Gerrard, to be Night Operator-in-Charge, Holborn.

Miss MINNIE BUTLER, Clerk-in-Charge, North, on being transferred to Kensington, was presented by the operating and maintenance staffs with a handsome pair of silver candlesticks and a pencil case.

Miss FLORENCE WADESON, Operator, East Ham, on leaving the service was presented by her colleagues with a handbag.

Miss MAUD NUTLEY, Operator, East, on her transfer to Hop was given a gold pendant by the staff.

Miss ADA KNAPMAN, Clerk-in-Charge, Brixton, on her recent transfer to North was presented with a handsome amethyst and pearl pendant.

Miss CELIA HOOPER on her promotion from Hammersmith to be Clerk-in-Charge, Brixton, was presented by her former staff with a gold ring.

### MARRIAGES.

Miss MABEL MASON, Private Branch Exchange Operator, Bristol, who recently left the service to be married, was presented by her colleagues on the traffic staff with a handsome case of silver spoons.

Miss ANNE DWYER, Operator, Westbury-on-Trym Exchange, who recently left the Company's service to be married, was presented by the traffic staff with a case of silver spoons as a mark of esteem.

Miss MABEL E. E. BAIGENT, Operator, Chippenham Exchange, who recently left to be married, was presented by the staff with a tea service. The subscribers to the Chippenham Exchange also made a voluntary subscription and presented her with a handsome set of cutlery. A letter also accompanied the gift expressing the subscribers' appreciation of the courtesy and consideration she had shown in the discharge of her duties as Chief Operator at the Chippenham Exchange.

Mr. E. W. WILSON, Cost Clerk, Dover, was presented by the East Kent district staff with a case of plated fish servers on the occasion of his marriage.

Miss HESTER BENTLEY, Senior Operator, Bradford, has resigned to be married, after ten years' service. The Bradford operators, as a token of esteem and regard, presented her with a flower stand and silver cake knife.

Mr. F. BASTOW, Test Clerk, Bradford, was presented with a handsome electro-plated flower table centre on the occasion of his marriage.

Mr. J. W. ENTWISTLE, Contract Officer, Bolton, was the recipient of three handsome engravings presented by the Bolton staff on the occasion of his marriage on Aug. 3. Mr. Entwistle is secretary to both the local and north-western province staff transfer committees, by both of which and by the staff generally his services have been much appreciated.

Miss MAY BRIMLOW, Operator, Bolton, left the service on Aug. 11 to be married. Miss Brimlow was presented with a Sheraton mahogany coal box and silver photograph frame by the staff. The presentation took place in the switchroom, and was made by Miss Slater, Clerk-in-Charge.



Mr. J. H. MARTIN, Foreman, Nottingham Factory, was the recipient of a handsome mahogany palm stand from the members of the Factory and Engineer-in-Chief's staffs, on the occasion of his wedding, Mr. C. E. Fenton making the presentation. The Cable and Receiver Departments also made him a present of a set of oak waiters with brush and crumb tray to match.

Miss CISSIE ARNOLD, Operator, Wolverhampton, has resigned to be married. Before leaving she was presented by the staff with a dinner service.

Miss ETHEL THURFT, Operator, Steyning, on resigning to be married, was presented with a tea service.

Miss GERTRUDE BRISTOW, Operator, Hove, has resigned to be married. She was presented with a dinner service.

Miss MAY HOLLAND, Traffic Clerk, Brighton, on resigning to be married, was presented with a marble clock.

Miss E. MAY DEAKIN, Works Order Clerk, Birmingham district office, left the service on July 23 to be married. She was presented with a silver-backed brush, comb and mirror by the District Manager, Mr. Williamson, on behalf of her colleagues.

Miss E. E. HORNE, Typist, Reading district office, resigned the Company's service to be married, and was presented with a time-piece by the members of the staff.

Miss MARGARET HERBERT, Supervisor, Reading Exchange, left the Company's service on June 2 to be married, and was presented with a tea service.

Mr. L. WALBY, Inspector, Reading, was presented by the staff with a set of cutlery on the occasion of his marriage.

Mr. H. BUTLER, Inspector, Reading, was presented by the members of the staff with a dinner service on the occasion of his marriage to Miss Herbert, Supervisor, Reading Exchange.

Mr. W. JACKSON, Storekeeper, Ashton-under-Lyne, was presented with a marble clock as a token of esteem on the occasion of his recent marriage.

Miss M. GALE, Coil Winder, Nottingham Factory, was the recipient of a handsome fire screen and pair of vases on the occasion of her wedding. Miss E. Clements, Forewoman, making the presentation on behalf of the department.

Miss LAMBERT left the Company's service on June 9 to be married, and has gone to reside at Hanley, Saskatchewan, Canada. She was presented by the staff with a silver-mounted calf leather writing case. Further, she was presented with a handsomely engraved silver Queen Anne tea service, together with a silver-mounted oak tray, by the subscribers to the Knaresbro' Exchange. She set sail for her new home on Aug. 16.

Miss CURRINGTON, Assistant P. O. Fee Clerk, Sheffield, resigned from the Company's service to be married, after nearly six years' service. Before leaving she was presented by the staff with a case of fish knives and forks, Mr. Thyne (Chief Clerk) making the presentation before a good assembly of the staff.

Miss E. LOWE, Supervisor, Leeds Exchange, was presented by the members of the operating staff with a silver fruit stand on the occasion of her leaving to be married. She had been in the Company's service fourteen years.

Miss I. ORMEROD, Operator at Nelson, has resigned to be married.

On the occasion of the marriage of Mr. W. CROMPTON, of the Engineer-in-Chief's office, a presentation was made to him on July 22 by Mr. Watts, on behalf of the staff, of a case of silver spoons and a case of silver knives and forks.

Miss ISABELLA H. BOWIE, Operator at Edinburgh Central Exchange, who left to be married, was presented with a dinner service by her friends there.

Miss WINNIE MORRIS, Operator, Portsmouth, was presented with a salad bowl by the operating staff and many presents from individual friends in the Company on the occasion of her leaving the service to be married. She sailed for Gibraltar on July 22.

Miss ALICE FURLONG HILL, Portsmouth, was presented with a tea service on the occasion of her leaving to be married, after nine years' service.

Miss LEADBETTER, Portsmouth, was presented with a cabin trunk on the occasion of her leaving for Canada, where she was married on Aug. 1.

Mr. HERBERT EATON, Draughtsman, Bank Exchange, Liverpool, was on the occasion of his marriage presented by his colleagues with a handsome tea service, three large pictures after Meissonier and Wallace, together with a framed testimonial. The presentation was made by the District Engineer, Mr. C. S. Wolstenholme.

Mr. ERNEST PARKINSON, Senior Clerk, Keighley, was presented with a handsome timepiece by the staff of the Keighley district on the occasion of his marriage. The presentation was made by the Local Manager, Mr. J. Aked.

#### London Traffic Department.

Miss ALICE CHARD, on leaving Finchley Exchange on account of her approaching marriage, was presented with a silver-plated jam dish.

Miss RUBY DIXON, Operator, Croydon, who resigned on Aug. 4 to be married, was presented with a hand-painted fire screen by the operating staff.

Miss ROSE BETTINGSON, who resigned from Gerrard to be married, was presented with a dinner service, the operators in the division giving a flower centre.

Miss MAY HISCON, Supervisor-in-Charge, Richmond, on leaving to be married, was given a very pretty eider-down quilt by the staff.

Miss DORA PRICHARD, late Senior Operator at Brixton, on leaving to be married, was given a copper kettle on stand by her late colleagues.

The following Operators leaving Westminster to be married received presents from their late colleagues as under:—Miss MINNIE WOODCRAFT, a dessert service; Miss MATILDA HARLAND, a tea service; Miss ELIZABETH JAMES, a cake dish and knife.

Miss FLORENCE RICHER, Supervisor, on leaving Avenue to be married, was presented by the staff with a pair of cut-glass scent bottles, a silver-mounted salts bottle, and silver hat pins.

Miss WINIFRED WEBSTER, Operator at the same exchange, was presented by the staff, on leaving to be married, with a fire screen. Miss Webster was also the recipient of several other gifts, including a brass crumb tray and brush, cheese dish, sardine dish and a watercress dish.

#### OBITUARY.

We regret to record the death of Miss KATE BLADES, Operator at Lee-on-the-Solent, in the Portsmouth area. She has been ill since Jan. 1 with rheumatism, which was followed by a complication, and after a very painful illness she passed away on Aug. 4. The Company was represented at the funeral by the Clerk-in-Charge, Portsmouth, Miss Yeates. The Portsmouth operators sent a large floral cross, and a wreath was sent by sub-exchange operators and caretakers. Many floral tributes were also sent by subscribers. Miss Blades was very popular amongst her subscribers, and was always a good operator and very attentive to her duties.

We also regret to record the death from an internal malady of Mr. SAMUEL MIDDLETON, Storekeeper, Swansea, at his residence on June 22, after an illness which extended over a year. The deceased was an old servant of the Company, having joined the service at Blackburn in 1881, whence he was transferred to Rochdale in 1887, and thence to Swansea in 1889. He was greatly respected by the whole staff, being a most conscientious worker, and one who was never known to be late. Of the early days of telephone work he had many interesting experiences. The funeral took place on June 25, and was attended by Mr. W. H. Crook (Chief Clerk) and Mr. J. Parvin (Chief Foreman), in addition to some 30 other members of the staff, six of whom carried him to his last resting place. As a mark of esteem a beautiful floral wreath was sent by the staff.

It is with regret we have to announce the death, on July 2, of Miss VIOLET BUTTAR, of the Contract Department, Dundee. Miss Buttar was held in high esteem by all members of the staff in the Dundee and Perth districts, her genial manner endearing her to all who came in touch with her in the course of her duties. A large wreath was subscribed for by the staff as a token of their respect. Messages of condolence and a very handsome wreath were also forwarded from the staff of the Aberdeen district where Miss Buttar was greatly esteemed, having been temporarily connected with that district for a period of six months. Much sympathy is felt for the family. The Company was represented at the funeral by the Contract Manager, Mr. G. G. Tennent.

#### THE COMPANY'S CORRESPONDENCE CLASSES, 1909-1910.

We give below a list of the members who obtained the first five places in the various courses of the above during the past session:—

"A" COURSE.	Name.	District.	Percentage.
1st place ..	Boyd, R. ..	Glasgow ..	99.4
2nd " ..	Pattison, C. ..	Glasgow ..	98.9
3rd " ..	Crispin, W. ..	Met. Engrs. Dept.	98.4
4th " ..	Wright, J. W. ..	Sheffield ..	98.4
5th " ..	Carter, A. O. ..	Exeter ..	97.4
"B" COURSE.			
1st place ..	Ashcroft, C. G. ..	Manchester ..	100.0
" " ..	Davidson, S. J. ..	Manchester ..	100.0
3rd " ..	Sim, W. ..	Exeter ..	99.4
4th " ..	Taylor, G. H. ..	Manchester ..	97.9
5th " ..	Taylor, G. W. ..	Leicester ..	97.4
" " ..	Wright, J. W. ..	Sheffield ..	97.4
"C" COURSE.			
1st place ..	Bennett, S. Y. ..	Bristol ..	100.0
" " ..	Cole, G. T. ..	Bristol ..	100.0
" " ..	Hopper, E. ..	Blackburn ..	100.0
" " ..	Parnell, T. O'C. ..	Bristol ..	100.0
5th " ..	Sleigh, C. G. ..	Met. Engrs. Dept.	99.2
" " ..	Thornley, H. ..	Blackburn ..	99.2
"D" COURSE.			
1st place ..	Taylor, G. H. ..	Manchester ..	98.7
2nd " ..	Goulden, W. ..	Eng-in-Chf's Dept.	97.5
3rd " ..	Magnall, J. ..	Manchester ..	96.4
4th " ..	Friday, F. W. ..	Eng-in-Chf's Dept.	96.2
" " ..	Herink, H. J. ..	Norwich ..	96.2
" " ..	Strong, E. ..	Eng-in-Chf's Dept.	96.2
"M" COURSE.			
1st place ..	Beames, A. W. ..	Swansea ..	100.0
" " ..	Chislett, W. W. ..	Swansea ..	100.0
" " ..	Jones, Miss E. ..	Newcastle ..	100.0
" " ..	Thomas, J. A. ..	Swansea ..	100.0
" " ..	Williams, A. ..	Swansea ..	100.0
"N" COURSE.			
1st place ..	Coulson, A. J. ..	Norwich ..	100.0
" " ..	Doggett, F. A. B. ..	Norwich ..	100.0
" " ..	Herink, H. J. ..	Norwich ..	100.0
4th " ..	Asplin, A. T. ..	Norwich ..	99.6
" " ..	Anderson, J. M. ..	Glasgow ..	99.6

#### GALLANT RESCUE FROM DROWNING.

MR. J. A. HEWITT, of the Solicitors Department Head Office, whilst walking along the Thames Embankment on the afternoon of July 28 last, saw an unfortunate woman throw herself in the river, and without waiting to divest himself of any clothing he dived in and succeeded in holding her up until the arrival of the police boat.

The magistrate of the Bow Police Court warmly commended Mr. Hewitt on his plucky performance, and the police authorities have placed the matter before the Royal Humane Society. It is hoped he will receive the recognition he deserves.

# THE National Telephone Journal

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## TELEPHONE MEN.

### LIII.—ALFRED MAGNALL.

ALFRED MAGNALL was born at Birkenhead in 1865, and educated at private schools in Ashton-under-Lyne. Owing to the death of his father he had to turn out and earn his own livelihood very early in life, and realising later the need of better education he joined the night schools of the Liverpool School of Science and obtained certificates. His connection with telephony began

when he entered the service of the Lancashire & Cheshire Telephone Exchange Company at Liverpool in 1883, and he took part in the erection of the first trunk route between Manchester and Liverpool, which was opened for use on Jan. 1, 1885. It may be of interest to note that these were single circuits on 24-inch and 32-inch arms. Each insulator had a galvanised iron guard surrounding it, the latter being carefully connected to earth by means of earth wires neatly stapled round each insulator bolt hole, and connected to the pole earth wires. A line earth wire which was run the entire length of the route (40 miles) on brown insulators was attached to the pole by means of a coach screw fitted below the arms. The cross-talk on these wires was such that when listening on one wire all that was going over any of the others could be heard, but in those days so long as A and B got into communication and understood each other, they took no notice of any noise and chatter going on at the same time, and they were perfectly satisfied with the service. In damp foggy weather or during a hoar frost, ringing was impossible over these circuits, yet when Manchester and Liverpool did get hold of each other speaking was really good.

Mr. Magnall remembers a certain engineer one morning telephoning to him when such conditions prevailed and instructing him to disconnect the main "line earth at Liverpool end." He did so, but no improvement in the insulation of the wires ensued and they had to struggle through until the sun came out to do the

needful. Testing these circuits was a hopeless task for a stranger, as the only means of judging whether any actual faults existed was obtaining a constant from the whole, each day, and working from that.

The Company had for some years the maintenance of the block telegraph system on the Mersey Tunnel Railway, of which Mr. Magnall had charge for some time, and from which he gained useful experience of railway work generally. He was in attendance when the tunnel was opened on Jan. 20, 1886, by the late King (then Prince of Wales), accompanied by the present King and the late Duke of Clarence.

When in April, 1886, a fire occurred at the Liverpool Central Exchange, burning out the whole of the testroom of which Mr. Magnall was then in charge and part of the multiple board, he was on duty for four consecutive days and nights. He remained in charge of the testroom until he was appointed Assistant Engineer in July, 1890.

Previous to the construction of underground works in Liverpool the overhead plant suffered much through fires, and Mr. Magnall was called out so frequently that he was almost a member of the fire brigade. On one occasion there was a fire in Wood Street at a cotton warehouse on the roof of which the Company had a number of wires and gutta percha-covered cables, and to prevent further damage Mr. Magnall went on the roof and cut the cables so that they could be drawn away at each side. On trying to leave the premises he found all ordinary means of egress cut off, and was obliged to place

foot-runs over a narrow street from the burning building to another, and cross on his hands and knees.

Under the supervision of Mr. Turney, of the Western Electric Company, Mr. Magnall jointed the first dry-core lead-covered cable to be laid in this country, through the Mersey Tunnel in 1891.



Owing to the great use which has been made of this class of cable, the experience gained has been of much service to him. The joints were "boiled out," a method which is being adopted to-day.

In 1892-3 Mr. Magnall was in charge of the line work in connection with the transfer of the Liverpool Central Exchange, when 4,560 wires had to be dealt with.

He was appointed Local Manager at Warrington in February, 1893, and in the following May was given the District Managership of South-West-Lancashire.

On Jan. 1, 1899, he was appointed Engineer for the Manchester district. Since being there he has conducted many important change-overs and carried out large works.

Mr. Magnall has always taken a great interest in the telephone societies. He was president of the Manchester Telephone Society on two occasions, and has read papers at Manchester, Liverpool, Bolton, Warrington, Hanley, Leicester and other towns. He has been an occasional contributor to the JOURNAL, and has attended every meeting of Head Officers and taken part in the discussions.

Mr. Magnall is known as a strict disciplinarian, who will not tolerate poor work or overlook neglect to carry out instructions. The telephone is his recreation, and his work is his sport. Many of his cycle rides in the evening or at week-ends have been to supervise work in hand, to locate a subscriber's place, deal with a wayleave difficulty or similar work. During the last few years, however, he has taken to bowling, and has been chairman of the Withington Bowling Club for over five years.

#### INTER-DEPARTMENTAL AND INTER-DISTRICT AMENITIES.

By EDGAR J. FRASER.

It may not be amiss if a Scot calls attention to an unmistakably Scots failing, which in our Company has spread till it is no longer Scottish only but national in a peculiar sense, and which must affect adversely the efficiency for which we say we individually and collectively strive so much. I mean the habit, for it has become a habit, of dissembling our love. It is perfectly true that there is a certain sweetness to be extracted from one's own criticism or from one's own remembrance of a disregarded service instruction and the consequent adjustment of the erring department or district to the narrow way. But that sweetness should be extracted from one's self-commendation alone and not from the discomfiture of others.

In this connection many instances recur to the mind when, to put it bluntly, courtesy would have prevented soreness and retaliation and friction. To the proper type of man—and if we have not got him we should dispense with the usurper—it is sufficient to point out his error. His regret will not be more poignant because you "rub it in"; "rubbing it in" will simply destroy much of the value of the experience to him. No department, no district, no individual even, has any right to communicate with another in terms of superiority or in tones calculated to induce acerbity and retaliation, and it is unwise to take obvious pleasure in correction. Just remember, you who "rub it in," that even Homer has been seen to nod, and a vindictively retentive memory will some day remind you of it.

This is not simple platitudinising. However funny or enjoyable a philosophical onlooker or participant may find a continual verbal wrestle on the catch-as-catch-can plan, the result is a loss of staff amity, the weakening of efficiency and harm to the Company's work, and everyone who reads these words will know cases where friendliness will effect its end much more quickly and profitably than even legitimate complaint. Yet I throw out the suggestion that those who wish friendliness should show it; otherwise—*Nemo me impune lacessit*.

#### NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY, LONDON.

The following grants were made during August:—

Maintenance Department (three) .. ..	£15	2	6
Engineers Department (five) .. ..	18	0	0
Traffic Department (three) .. ..	11	0	0
Head Office (one) .. ..	3	0	0
	£47	2	6

Total grants made to date, 280; £846 16s. 10d.

Donations received, £13 11s. 1d. Number of members at Aug. 31, 2,969.

#### EDUCATION OF THE TECHNICAL STAFF.

By P. T. W.

It is less than a year since an article under the above title appeared in the JOURNAL, and a further paper on the same subject may appear uncalled for. The question of education is now such a burning one, however, that it may be relied on to arouse interest, and though I am going to deal with a subject whose study may not be thought a profitable one, yet all must agree that it is at any rate interesting. It has not yet found its way into the curriculum of the Post Office engineer.

In one of the early numbers of the NATIONAL TELEPHONE JOURNAL appeared an article by Mr. Hare, entitled "The Broader Value of the Clerk." In this article the somewhat startling statement is made that most engineers are good and most clerks are bad. This is afterwards explained somewhat on these lines, that whereas the clerk requires little special training, and but little daily use of judgment and initiative, he lacks in his daily work the opportunities of fitting himself for a position of trust or one requiring administrative abilities. On the other hand, the engineer dealing directly as he does with the actual world around him learns without any chance of shirking his lesson, the necessity for correct reasoning from sure data. Mr. Hare concludes by suggesting certain studies for the junior clerk, one of which—namely, logic—I have chosen as the subject of this paper. I propose to give a few examples illustrating the use of this science, and indicate in an amateurish sort of way how important an item it is in the education of all men, whether on the technical or the office staff.

All reasoning is of two kinds; deductive or inductive. In the one case a conclusion is arrived at from certain premises which are taken for granted; in the other case a conclusion is arrived at, and premises obtained from experiments and observation of a number of particular cases. In the deductive method argument or enquiry proceeds from general principles to a particular case. With induction the reverse occurs, a general proposition being obtained from particular data. The difficulties in obtaining a correct conclusion are, in most cases, considerable, and the number of fallacies accepted as arguments in politics, religion, etc., show how universal is the indifference to logic.

Macaulay gives a typical example of the inductive method of reasoning in his essays. "I ate mince pies on Monday and Wednesday, and I was kept awake by indigestion all night. I did not eat any on Tuesday and Friday and I was quite well. I ate very sparingly of them on Sunday and was very slightly indisposed in the evening, but on Christmas day I almost dined on them and was so ill that I was in great danger. It cannot have been the brandy which I took with them for I have drunk brandy daily for years without being the worse for it." The inference is, of course, that mince pies have caused the trouble. It is obvious, however, that the case is not made out against mince pies, as it may have been the mixture of mince pies and brandy which did the mischief. A case where all the possible causes of some known effect were not adequately considered.

Modern scientific investigations in all subjects are almost invariably carried out on the following lines:—The investigator frames a hypothesis, and assuming it to be true, deduces conclusions from it. Then, by comparison of these conclusions with the data from which he started, verifies (or disproves) the truth of the hypothesis. An episode in the history of chemistry will illustrate this. There are certain substances, about 80 in number, that cannot (so far as is at present known) be split up into anything simpler. These are the chemical elements. The chemist cannot estimate the weight of an element, but he has determined their relative weights by countless experiments on elements in combination. A discovery of great importance was made by a Russian chemist when he noticed that in a table of the elements arranged in order of their atomic weight, those of similar properties were separated by regular intervals. That is to say, if any property common to all elements be considered, and a curve plotted showing in what degree each element exhibits that property, it will be found that the curve rises and falls at regular intervals. No matter what common characteristic we may be plotting, the line representing it undulates, more or less



uniformly. This led Mendeléeff to the greatest generalisation of modern chemistry—the formulation of the periodic law. A near analogy may be found in acoustics. Each musical note has its own rate of vibration, which bears a simple ratio to its octave. So also the gamut of the elements may be divided into groups strangely resembling octaves. Any element can be allotted a place in this series once its properties are known, and its atomic weight approximately estimated. Atomic weights that would not fit into the scheme have been recalculated and found incorrect, and the properties of new elements have been anticipated, solely on the information given by their atomic weight.

Still more startling is the fact that as a result of gaps appearing in the scale to which no elements could be assigned, Mendeléeff postulated elements for the spaces that demanded them, and proceeded to define their properties from a study of the "octaves." Some time after, these elements were discovered, having the properties exactly as foretold.

Finally, and as a direct result of the knowledge acquired by application of this law, it is now possible to form a theory on the ultimate constitution of matter. Just as each musical tone is related to all other tones, there appears to be some intimate relation between the various elements which is at present uncertain, but may in time be found due to waves in the medium of ether as musical notes are due to waves in the more tangible medium of air.

A better instance of induction and subsequent deduction could not well be quoted.

In the preceding example an affinity between the laws regulating the various harmonies and combinations of music and those of matter has been suggested. This conception seems to me a useful one, and in this case without danger, but fallacies from false analogy are possibly the most common cause of misconception that a student has to contend with, and cases are of frequent occurrence in magazines and newspapers. Mr. Milnes in his article on the "Electron Theory" has pointed out how misleading analogy could be, instancing the popular idea of electricity as an imponderable fluid possessing the property of inertia, and I have heard the law of inertia being used as a proof that because it had not rained for three weeks it was not likely to rain on the following day. Argument by example is more widely applied, not only in the process of inference but as proof, than any other form of argument, and the danger of overlooking some hidden element in the facts and thereby generalising too freely is often neglected by the unwary. It is so much less trouble to see that two things bear a striking resemblance than to discriminate accurately how far the resemblance really goes, and wherein lies the difference. I suppose every reader can recall to mind instances of fallacy by false analogy, and the injustice of the "not a parallel case." Fallacies are most interesting and deserve an article to themselves. There are quite a number of them on the market, so to speak, but all have this point in common—they will successfully bring any argument to a wrong conclusion.

They are therefore worth some study.

Instances of one or two of the more popular kinds will illustrate this. They all represent incorrect reasoning in some form or other.

The fallacy of equivocation consists in using the same term in two distinct senses. For instance—Nothing is better than wisdom: dry bread is better than nothing, therefore dry bread is better than wisdom. In this case the fallacy is obvious, but it is not always so apparent, as the premises are often placed at a considerable distance from each other in the course of a long argument.

Another logical fallacy is frequently found of which the following are examples. The reader can pass or reject as his powers of reasoning suggest:

1. The circuit is open if the fuse has blown; but the fuse has not blown; therefore the circuit is not open.
2. If the circuit is open the fuse has blown; but the circuit is not open; therefore the fuse has not blown.
3. The fuse has blown if the circuit is open; but the fuse has blown; therefore the circuit is open.
4. If the fuse has blown the circuit is open; but the circuit is open; therefore the fuse has blown.

The only rule necessary for testing the validity of the above is this; that either the antecedent must be affirmed or the

consequent denied. Accordingly No. 1 must be rejected because the antecedent is denied. Another class of conditional argument is the dilemma. Such an argument is usually fallacious because it is seldom possible to find instances where two alternatives exhaust all the possible cases. This form of dilemma is stated thus: If A is B, C is D, and if E is F, G is H, but either A is B, or E is F, therefore either C is D or G is H. A retort can often be made by producing as cogent a dilemma to the contrary effect, as instanced recently in a weekly magazine. "A pupil refused to pay his teacher of rhetoric on the following grounds:—'If you have taught me rhetoric I shall be able to persuade the judge that I ought not to pay; and if I cannot persuade the judge, then you have not taught me rhetoric, and therefore I ought not to pay.' To which the master replies: 'If you can persuade the judge then you have been taught rhetoric, and therefore ought to pay me; if you fail to persuade the judge then you will have to pay me.'"

Fallacies due to some important factor having been overlooked have already been referred to. Of a similar nature is the irrelevant conclusion, which consists in arguing to a wrong point, and may be likened to a traveller who has performed a journey but got to the wrong destination. This fallacy is the great resource of those who have to support a weak case, and is said to be not unknown in the legal profession, where a barrister's brief was endorsed "No case; abuse the plaintiff's counsel." Of such a kind, too, is the fallacy involved in the act of proving that there are weighty objections against a particular reform, when what is required to be proved is that there are more weighty objections against its adoption than against its rejection. Head Office must have experience of this. Sometimes the districts think they have.

Mathematics occasionally provides one with cases of fallacious reasoning. Of such a kind is the proof that  $1 = 2$ :

$$\begin{aligned} \text{Let } a &= b. \text{ Then } ab = b^2 \\ \text{and } ab - a^2 &= b^2 - a^2 \\ \therefore a(b - a) &= (b - a)(b + a) \\ \therefore a &= b + a \\ \text{or } a &= 2a \\ \text{i.e., } 1 &= 2 \end{aligned}$$

"But what has all this to do with the education of the staff?" I am asked. Just this—that the final end of knowledge is practice, and the first requisite of knowledge is that it shall be true, and the difference between the scientific man and his unscientific fellow is simply that the former employs machinery to confirm his impressions or theories, and to discriminate between truth and falsehood, and between sufficient and insufficient evidence, while the latter takes things for granted. The necessary machinery is embraced in logic, which after all is uncommonly like trained common sense.

An inspector was recently sent to a subscriber who had complained of his transmitter being out of order. The E.T. was called up and tested line—"Current on loop." The instrument was a local battery magneto wall set. After a hunt round the pivot of the switch-hook was found loose. This was tightened, and a second test made with the same result. The springs of the switch-hook were then adjusted—something had to be done—and a call was made to the operator, who being busy probably, heard the inspector all right. "Clear" was given. "Switch-hook springs adjusted." Asked to explain how that had cleared the fault this inspector had to plead ignorance. The result of the next test was "current on loop." Further examination showed a broken wire on the switch-hook, which allowed the local primary circuit to be in bridge across the line. Fortunately this class of inspector is now practically extinct, and there is a very general keenness to understand intelligently the relations between cause and effect as instanced by the fault and the trouble caused.

Sufficient has been said, I think, to show the uses of logic as a mental training. Its range is far wider than can be covered within the scope of a short article, and in any complete course of the subject such items as degrees of probability, chance and its elimination, hypothesis, observation and experiment, etc., would be included.

**Western Electric Company.**—Mr. J. E. Kingsbury, formerly General Manager in London of the Western Electric Company, has joined the Board of Directors of Western Electric Company, Limited.

## ELECTRIC CLOCKS.

By J. H. STEWART, *Gerard Street.**(Concluded from page 128.)*

Fig. 4 shows the dial mechanism: the ordinary "works" are dispensed with, the only wheels retained being the "motion" wheels which give to the minute and hour hands the proper ratio of 12 to 1 as they turn: the motion wheels can be seen in the figure behind the large driving wheel; the latter contains 120 teeth corresponding with the number of half-minutes in an hour: the hour hand is fixed to the same spindle as the driving wheel, and therefore moves by half-minute steps each time the click E pushes the wheel one tooth forward. The click E normally holds the wheel in the position shown in the figure. When the electro-magnet B is energised, the armature C pulls up and the click E is drawn back. On the current ceasing, the flat blade spring F pushes the click, and the wheel is moved one tooth forward. The spring blade is made to do the driving because it exerts a constant force on the driving click: had the electro-magnet been arranged to do the driving, a very variable force would be transmitted to the wheels, as the strength of the battery varied. The backward movement of the click is limited by the stop I, which performs a double function. It is clear from the figure that the notch in the arm D engages with the stop whenever the armature C is drawn up, when the back-stop lever G cannot rise; thus the wheel is locked during the time that the click E is drawn back and momentarily unable to perform the locking function. The means taken to prevent "tripping," or the passage of more than one tooth at a time under the click E, are worth close attention. The click engages with the minute wheel at such a point that the click rises as it drives, until it locks under the adjusting screw H, which is set so that locking occurs when the wheel has moved forward the space of one tooth. An inspection of the figure will make it plain that, however violently the driving click urged the wheel forward, it would be impossible for more than one tooth to pass under the click with each impulse. It may be noted in passing that the same locking device occurs in our subscribers' registers to prevent more than one call being recorded for each depression of the operator's

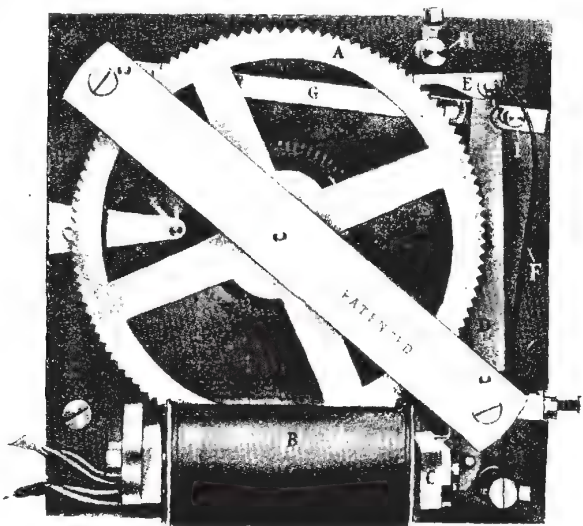


FIG. 4.

register key, and it is well known how satisfactory this mechanism has proved to be.

Any number of dials may work in series with one master clock; all that is necessary is to increase the battery E.M.F. as the dials are increased in number and the resistance of the circuit thereby increased so as to maintain the same current as before. In large installations, worked from the central storage battery, it is

usual to insert a few resistance spools in series with the clocks, the spools being removed as extra dials are added. This is found to be a more convenient arrangement than altering the battery power each time dials are added or removed from the circuit.

Electric clocks are peculiarly suited to C.B. exchanges because they can work across the central battery, which provides an unfailing supply of current. The inconvenience of periodically

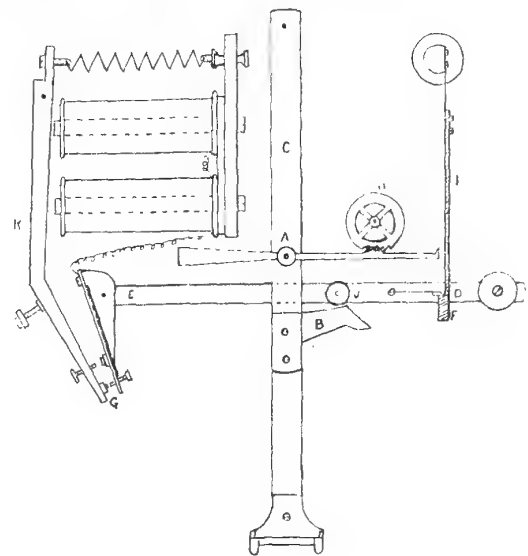


FIG. 5.

changing the battery which arises when working off primary cells is obviated, and also the current supply from accumulators is more constant.

Messrs. Gent & Company's system, which is in use at most of the Company's larger exchanges, consists, like that just described, of an electrically driven master clock controlling a set of dials in series with it, and in all cases they are worked from the exchange storage batteries.

In its earlier form the pendulum movement contained a wheel corresponding to the 'scape wheel of an ordinary clock, but its action is quite different, for instead of driving the pendulum which is the usual office of a 'scape wheel, the pendulum drives the wheel; the pendulum movement however need not be further described, as it has now been superseded by an improved and simplified form, called the "Horne" pattern, shown in Fig. 5. A crutch C, which is forked at the lower end to engage with the pendulum, carries a cam B, and also a light arm A pivoted on the crutch. Behind the crutch is the gravity arm D, centred at E, carrying a gold contact-screw G: gold being used because it is equally suitable with, and at the present price much cheaper than, platinum. The gravity arm is normally held up by the catch F.

The wheel H, contains fifteen teeth, one of which is cut deeper than the rest, and a pin on the arm A engages with the wheel and pushes it one tooth forward each time the crutch C makes to the right. The pendulum swinging seconds, the wheel moves a complete revolution each half-minute. At every swing to the right the light arm A passes through a slot in the flat brass strip I, until the pin engages with the extra deep tooth on H, mentioned above. This allows of the arm A rising so that it no longer passes through the slot in I, but pushes it back so that the gravity arm releases from the catch F.

A roller J attached to the arm runs down the cam B, as the pendulum swings to the left, supplying energy sufficient to keep it swinging freely for the next half-minute. The downward movement of the gravity arm is arrested by the contact G making with the armature contact, when a circuit is established through the electro-magnet and the dials. The armature pulls up and flicks

the arm on to the catch F, again ready for the cycle of operations to be repeated at the next half-minute.

The pendulum rod is made of wood, well varnished for protection against atmospheric moisture, with an iron and zinc bob in proportions suitable for compensation.

The dial mechanism is shown in Fig. 6. The electro-magnet contains only one bobbin, but it will be seen that the armature and poles are shaped in such a way that when energised both poles assist in attracting the armature, and there is a good magnetic circuit.

The bobbin is wound to a resistance of 4 ohms and works with a minimum current of 150 milliamperes; two dials in series should therefore work well across one dry cell, the current being equal to

$$\frac{1.5 \text{ volts} \times 10^{-3}}{4 + (.25 \text{ int. R. of cell})} = 182 \text{ m.a. ;}$$

this is handy to remember when testing dials. If installations are worked off Leclanché or dry cells, one extra cell for every two dials is the battery power allowed.

Another system that possesses distinguishing features, is the Magneta Company's; as the name suggests, the driving current is derived from a small magneto-generator or inductor, as the makers term it, consisting of a permanent magnet and a fixed coil on which current impulses are induced by the movement of an iron core. As in the synchronome system, the dials and master clock are all in series, but in this case the master clock is not electrically driven. It consists of an ordinary key wound clock with two trains of wheels—viz., a going train and a power train, the latter corresponding to the striking train in an ordinary clock. The power train is released once every minute, causing the iron core of the inductor to make half a turn; a current impulse passes round the circuit and the hands of all the dials move one step forward. The dial mechanism is of the polarised type, one impulse moving the armature in one direction, and the next impulse being of opposite sign moving it back. Each movement of the polarised armature carries the minute hand one step forward. Another feature of this system is the entire absence of contacts either in the master clock or the dials, thus removing a source of trouble that must always be reckoned with where contacts are employed. The greater the number of dials on a circuit the larger must be the inductor, and as the energy for driving it is derived from the weight on the power train, this weight becomes heavier and the winding more laborious the larger the installation. The master clock is wound daily or every two days as the case may be.

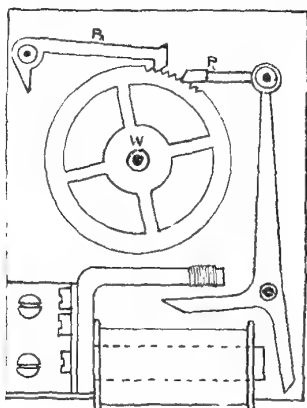
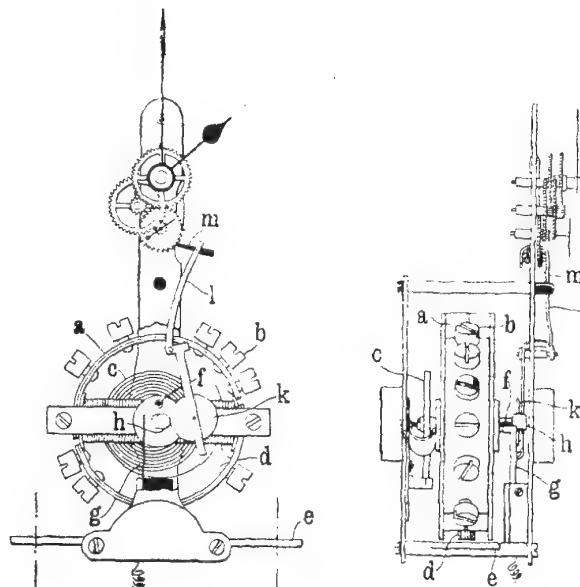


FIG. 6.

The clocks of the Self-Winding Clock Company on the Metropolitan, District and Tube railway stations are examples of independent electric clocks. Each clock has the ordinary works and is spring driven; the only addition is the electric winder which is controlled by a contact within the clock which is made hourly. The winder is very simple, being an ordinary electro-magnet with a driving click attached to its armature. On contact being made, the armature vibrates and the click drives a ratchet wheel, and this action continues until the spring is fully wound, when the circuit automatically opens.

The clocks are placed in parallel across the railway company's 60-volt signal mains, and each winder is in series with a lamp resistance which absorbs most of the voltage, leaving about 5 volts only across the terminals of the winder. Being in parallel across the mains, should one clock fail the others on the same circuit are not affected. These clocks are also synchronised every hour, but the synchronising or timing arrangements are quite separate and must not be confused with the self-winding apparatus



FRONT AND SIDE VIEWS OF "EUREKA" ELECTRIC CLOCK.

FIG. 7.

FIG. 8.

described above. Separate leads are run from the signal mains and the clocks joined up in series groups of twenty, a synchronising magnet being fitted behind each dial. One extra single make and break relay is added to the series, and current at 60 volts from the mains brought through its contacts to control a second group of twenty dials and so on.

The synchronising current is controlled by an ordinary regulator clock which is timed daily from Big Ben at Westminster: it may be observed that the first stroke of the hour on the Westminster clock denotes the true Greenwich mean time. The master clock makes contact hourly, and, precisely at the hour, a momentary current is sent round a group of clocks. Each armature as it pulls up can operate the minute hand. Should the latter be either fast or slow, it is moved so that it points exactly to the hour, and thus all the clocks on the system are kept in unison.

The Eureka is the latest development of an independent electric clock: much originality is displayed in its design, and the care bestowed on every detail both electrical and mechanical augurs well for its success. The feature that first strikes one is the large balance wheel A, Figs. 7, 8 and 9, which is like an ordinary watch balance wheel, very much magnified. It is about 3 inches in diameter and 12 ounces in weight. An electro-magnet wound with enamelled copper wire to 36 ohms is fixed across the inside of the balance wheel as shown in Figs. 7 and 8, the lettering being the same in each. A is the rim of the wheel, D the core, R the coil, P and P' two flat plates of soft iron forming a return magnetic path. S is an iron screw passing through the rim and connecting the core with the iron plates, forming a yoke.

The wheel and coil are mounted on ball bearings, which permit the balance to work with less friction than would a jewelled bearing.

A large spiral spring, attached to the balance, governs its time of swing, and is adjusted so that the wheel makes forty swings or twenty complete periods per minute. One end of the coil makes on the frame and the other is brought to the platinum pin F, one side of which is insulated with ivory. As the balance swings the pin makes contact with the platinum-tipped spring G, which is so placed that the pin F passes alternately first in front and then



behind it, the result being that current only passes at each alternate swing as the ivory part of the pin makes contact with the spring G at every other beat; current, therefore, is only fed to the magnet coil once every period, or double swing.

As the duration of contact is only one-eightieth second, and occurs but once in three seconds, the current consumption from the single dry cell that works the clock is extremely small, and some of the early Eureka clocks have been working from the same dry cell for the last three or four years. The contacts are so placed that the coil is energised when the pole D of the magnet is about  $30^\circ$  from the fixed iron armature E, towards which it is drawn till the coil is vertically over E when contact is broken.

The impulse thus imparted at each period maintains the balance wheel in motion, and is delivered when the balance is at the middle part of its swing and therefore travelling fastest; as in the case of the pendulum, there is least resulting disturbance when the impulse is applied at this point.

Fig. 7 shows how the motion is conveyed to the hands; K is a freely running steel disc mounted on the arm L, and each time the cam H passes, K is lifted and with it the arm L, pushing the

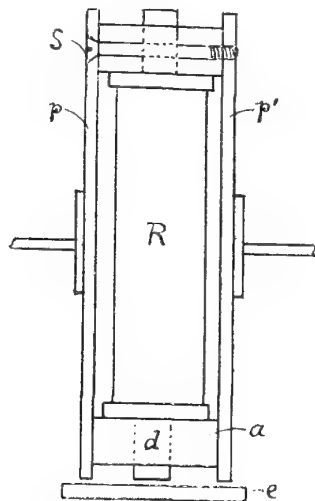


FIG. 9.

driving click M forward by one tooth for each swing of the balance wheel. It might appear, as the impulses given to the balance wheel must necessarily vary in strength as the battery weakens, that accurate time-keeping could not be attained, but springs like the pendulum are subject to the harmonic law; that is to say, the displacement of a spring is proportional to the force exerted upon it if not too great, so that if the magnet R be strongly excited, the balance wheel swings through a large arc and as the battery weakens the swings become smaller, but the period of vibration will depend solely upon the mass of the wheel and upon the strength of the spring and not at all on the amplitude of vibration, and as long as the period of vibration remains constant the clock will keep time.

Although the clockmaking trade has hitherto looked upon electric clocks with suspicion, or regarded them as curiosities not to be taken into serious account, both the series dial systems and the independent or self-contained electric clocks have undoubtedly emerged from the experimental stage, and it is encouraging to note that such an eminent horologist as Sir H. H. Cunynghame expresses an opinion that electric clocks must be regarded as the timekeepers of the future.

**Visitors.**—During the month Messrs. Ren Nakashoji, Vice-Minister of Communications and President of the Board for Investigation of Hydro-Electric Power Resources; H. Suzumura, Secretary of the Bureau of Electrical Exploitations; Shiro Uchida, Architect of the Department, and Risuke Wakameda, Electrical Engineer, all of the Department of Communications, Tokyo, Japan, visited Head Office, and subsequently the Gerrard Exchange, the Observation Office and Operating Schools.

## THE RELATION OF THE ENGINEER TO THE TELEPHONE INDUSTRY.\*

BY FRANK F. FOWLE.

### PART I.—ENGINEERING TRAINING AND QUALIFICATIONS.

ONLY recently has the telephone engineer begun to enjoy a rank which establishes him on a plane of equality with engineers in other fields, either as to his professional ability or the scope of his usefulness. For a long period it was quite commonly believed that the telephone industry required little engineering ability beyond that necessary for dealing with switchboards and instruments. This view persisted for a long time after the early days of the art, but happily it has been modified in recent years.

The industry in the United States as a whole now ranks about equally with electric lighting, on a comparison of total investment in plant. The engineering problems are probably not matched for intricacy in any other field. Therefore it is not apparent why the telephone engineer, from the standpoint of the magnitude and development of the art, should have been considered entitled to only an inferior rank. Nevertheless it seems to be a fact that he has been underrated extensively, both by those within and without the industry.

This misapprehension arises no doubt from ignorance in many instances as to the real need for engineering, and in part perhaps from the misconception that the telephone is a good deal of a toy, instead of an apparatus as much liable to misuse as any other machine. It is particularly desirable to correct this view among persons engaged in the commercial and financial sides of the telephone business, and the owners of telephone properties or securities. The purpose of this article is to draw the attention of telephone men to this matter, and to attempt some explanation of the need for, and the nature of, engineering.

There are three prominent reasons for this general lack of appreciation. In the first place, telephone engineers have not, because of professional ethics, publicly advanced their claims for recognition; they regard and treat this matter much as do lawyers and physicians. The recognised channels through which engineers may properly announce or present their problems to other engineers for discussion are through papers read before professional societies or published in the technical press. The business public hears little directly of engineering work, except as it may be of such a nature as naturally to command public attention.

In the second place, the telephone art has been subject to peculiar conditions on the commercial side, which as a whole have tended to suppress the free and impartial discussion of engineering problems. The field has been occupied by two great interests, or groups of interests, the "Independents" and the "Bell" companies. Keeness of competition has led to the belief in many instances that free discussion of engineering problems would lead perhaps to disclosures that might be taken advantage of commercially. In view of the circumstances this belief was only natural, but on the other hand it is unfortunate in one respect that it existed because without doubt it has tended to restrict the advancement and recognition of the art. It also has been unfortunate for the engineers who have in so many instances been prevented from bringing their work before the proper professional bodies, for the sake of advancing engineering knowledge and securing that general discussion so important to sound progress. It is to be hoped that in time this obstacle to progress will wholly disappear.

In the third place, the commercial field has been quite largely developed, in farming and rural districts, by small operating companies who seem to have seen little or no need for engineering. It is possible, of course, to install a small telephone plant having a few hundred subscribers without having any real engineering work done. Telephones and switchboards have been quite extensively simplified and systematised, so that good equipment can be purchased in the open market, and pole line construction of the lighter sorts offers few difficulties. The sales staffs of manufacturing companies are usually ready to give such engineering assistance as may be necessary to install the switchboard and place it in

\* Extracted from *Telephony*, April 16 and May 7, 1910.

operation. And thus the throwing together of the component parts of a small system, so that it will operate after some fashion, is sometimes easily accomplished. But every company which embarks in business in this manner, passes over entirely such features as a study of the population in the territory served to determine the probable present and future development, the matter of providing adequate talking volume or transmission efficiency, the problem of laying out the most economical distribution system with a given standard of transmission, the proper choice of telephones and switchboards so as to secure the greatest transmission efficiency consistent with the cost, the matter of economically providing for growth in subscribers and traffic, the determination of a schedule of fair and profitable rates and, the problem of how much to set aside from the yearly revenues for a depreciation reserve fund, and how best to subdivide the accounts so as to show the several sources of revenue and the various expenditures according to their character. It is not to be supposed that these matters comprise the whole realm of telephone engineering, but they are fundamental.

A telephone company which embarks in business under such circumstances may, and frequently does, continue for a period of eight or ten years, perhaps, without meeting serious difficulties. The owners may suppose they are making money, but in some cases that fact has been very much in doubt. The most serious obstacles will not arise until the system has grown considerably, or perhaps not until the reconstruction period arrives or the system is consolidated with others. But the day of reckoning will inevitably arrive, and for many companies formed ten or twelve years ago, or longer, has already come.

A great deal might be written upon the necessity of engineering in the successful management of telephone properties, much more than there is space for in a brief article. But it is intended to point out first, in what follows, the fundamental reasons why engineering is an economic necessity, and then to bring out some of its benefits in describing the general relation of the engineer to the business.

#### *The Purpose of Engineering.*

Engineering may be defined as the application of science to the industrial arts, manufactures and commerce. Its whole purpose is to promote economy and efficiency in the use of capital, labour and raw materials. Our present-day civilisation is essentially a material one, and the age is one which is marked particularly by great achievements in commerce and industry. On every hand we meet problems which require in their solution the greatest scientific knowledge and skill. But we should couple with this definition of engineering the statement that the engineer must be essentially a good business man; that he must understand the rudiments of finance.

Broadly speaking, it is a fundamental truth that every community must produce wealth from some source, or suffer decline. The measure of success in commercial enterprise is efficiency in the production of wealth, or, otherwise expressed, net profits. Upon this test every venture must ultimately stand or fall. Therefore, it becomes necessary everywhere to avoid waste and extravagance, and to strive always for more economical production and use. And we find as a consequence, wherever applied science is indispensable in the industrial arts, in commerce and manufacturing, in transportation and communication, or in any other of our numerous activities, that the expert in applied science—the engineer—is a most important factor. Upon him rests a large burden of responsibility always, and in many cases his ability to solve the problems met determines the success or failure of the enterprise.

Then we may repeat that engineering is the application of science to industry and commerce, for the purpose of accomplishing things that otherwise would be impossible, and for securing the greatest possible degree of economy in the use of capital, labour and raw materials. This is well demonstrated by a consideration of our industrial and commercial development, in which engineering works of every kind and order of magnitude are everywhere present. The business man and the layman are naturally familiar with those works only whose results take on an outward material form, but the invisible work is oftentimes the substructure upon which the final result depends; it is fundamental and essential to all which follows,

and a mistake there may not be outwardly apparent until it is too late to correct it. Take, for example, a telephone distribution system, and suppose that it was planned inadequately to care for the growth in subscribers during the years immediately following the installation; the expense entailed in enlarging the system so soon after it was built could have been much reduced by providing the necessary facilities in the original installation, but how to do this intelligently could only be determined from a development study. The money saved by cutting down the engineering work would, in such a case, be offset many times in the course of a few years. The same illustration would apply to the design of the central office and its equipment. A situation even more serious would arise if the distribution system were to be designed with too little copper to secure adequate transmission: it would still be serious from a financial standpoint if there were too much copper. The proper amount of copper can only be determined from considerations of the laws underlying transmission, and a study of the traffic to be handled.

What has already been said in reference to the lack of engineering among some of the smaller telephone companies will apply, in less degree possibly, to some of the larger companies. There is a manager of a large system who maintained some years ago, that he could operate the business to better advantage without any engineers, but he has had occasion since to change his mind. There are no doubt many business men who now believe as this manager did, not from any lack of good faith in engineers as men, but from ignorance as to the real nature of engineering and the economies it makes possible both in construction and operation.

It would be unfair, however, to pass over the fact that engineering has sometimes been brought into disrepute with owners and business men through incompetence, unscrupulousness or bad judgment on the part of men who professed to be competent engineers. Loss of faith in such cases is only natural, perhaps, but to condemn all engineering on account of it is as unreasonable as condemning the practice of medicine because physicians do not always combat disease successfully. This touches the question of the engineer's education and training, which should be discussed briefly before passing to the application of engineering generally to the telephone business.

#### *Engineering Education and Training.*

Proceeding from the general definition of engineering just given, it will be apparent that the foundation of engineering education must be a thorough training in science. This is true regardless of what special field the engineer may enter when he takes up practical work. This basic training ordinarily includes mathematics, physics, chemistry, geology, mechanics, optics, heat, electricity, magnetism, thermodynamics, electro-chemistry, and possibly some allied subjects. These subjects will be studied both in the classroom and the laboratory. The course of training should then be extended to a study of the properties of materials, both raw and manufactured, and the properties of structures and earthworks with regard to their design and construction.

Training of this character is usually common to all engineering courses, and specialisation does not occur to any extent until half the course has been completed. The student must then choose his specialty, and his training thereafter takes on a special character. The subsequent training, speaking generally, will bear more particularly upon the application of the subjects before mentioned to the practical arts. This will embrace the properties of fuels and the laws of combustion, the utilisation of natural resources, the production, transmission, distribution and utilisation of power, the principles of traction and transportation, the means of transmitting intelligence, the production and distribution of artificial light and heat, the sources of water supply and the means of distribution for public consumption, and the principles of sanitation and ventilation and general considerations affecting the public health.

It is not to be supposed that any one course of training will embrace all of these subjects in equal degree. The major portion of the student's time will be devoted to his specialty, but at the same time it is necessary for an engineer in any particular field to know a great deal about the subjects in allied enterprises. This is probably the case in telephone engineering to a greater extent than in most other fields.

The best engineering schools confine their courses more to

theory and principle than to current practice of the day. The latter changes rapidly while the former do not, except as the field of knowledge is constantly expanding. The purpose of the technical school is, in the broadest sense, preparatory; the best schools do not aim to turn out men who are prepared to take immediate charge of responsible work, but, instead, to give them a thorough preparation, consisting of training in abstract and applied theory.

It may well be said that an engineer's training is hardly more than begun when he graduates from a first-class technical school. The real test comes in the application of theory to practice, and every engineer must pass through a course of experience of this kind, to fully qualify himself. At the same time he will become familiar with current engineering practice and with practical work. During this period he should come to know, with close accuracy, the cost of labour and materials entering into construction and operation. But above all, the engineer must possess the ability and sense to apply his technical knowledge and scientific methods in his chosen field of work, to secure always the maximum of output or production for a minimum of outlay. The ability to do this has been called by some, "Engineering sense"; it seems to be a faculty that must largely be inherited rather than acquired. Of course it must be trained and developed, but engineering, like other professions, is one which demands natural qualifications.

Nothing has been said of the engineer's general education and culture. The more of such training the better, for it increases his breadth of view and tends to counteract the somewhat narrowing tendency of a purely technical training. It is becoming increasingly difficult to give the necessary general studies during a four-year technical course, and there is little doubt that engineering education is approaching the same status as preparation for the law, medicine or the ministry. That is, a four years' general college or university course will be required for admission to engineering schools, and the engineering course will become post-graduate work, extending probably over three years. This will result in turning out men better prepared than those who take only a technical course.

It is very desirable that the engineer should have a good training in English; it is vital that he should be able to express himself clearly and forcefully, both in speaking and composition. Drawing, the other element in the art of expression, is surely essential. He should have, too, courses in languages, in economics, civil government, business law, accounting and finance. Or, to put it briefly, he should have in full the preparation which a business man would desire, because he must be himself a good business man to practice his profession successfully.

What has been said above in relation to engineering education is necessarily limited and is intended only to indicate the scope rather than the full substance of such training. But in leaving this matter it may well be emphasized that engineering is a profession and not a trade, and that engineering schools are not comparable in any sense to trade schools: the latter turns out artisans—men trained to use their hands in some form of manual labour and work by rule of thumb or under instructions, while the former turn out men who have been trained mentally to make use of the world's knowledge in the management and direction of affairs. No disparagement is meant or intended to the artisan or the skilled labourer, for whose co-operation the engineer has so much need; but it is intended rather to dispel the views that may be incorrectly held by some persons who do not do justice to engineers in general.

#### *The Engineer's Qualifications.*

The rudimentary definition of an engineer is of course "one who practices engineering." It is unfortunate that the term engineer should have other meanings in common use, and on that account it has become necessary to qualify the term by some prefix or adjective, such as consulting, constructing, contracting, operating, etc. There are, moreover, many branches of engineering which make it necessary to add other qualifying terms, such as electrical, mechanical, civil, mining, chemical, industrial, etc.

The definition of an engineer in the professional sense is more difficult to state, partly because there is no legal bar against the practice of engineering by anyone, and quackery and incompetence find no obstacle, whereas lawyers must pass the bar examinations, physicians must pass the State examinations and clergymen must

be ordained by the Church. There is no distinguishing mark or title in the profession of engineering which has any legal standing. But there are several engineering societies, whose membership is composed of the foremost men, which have done much to give standing to the profession. Foremost amongst these are the American Institute of Electrical Engineers, the American Society

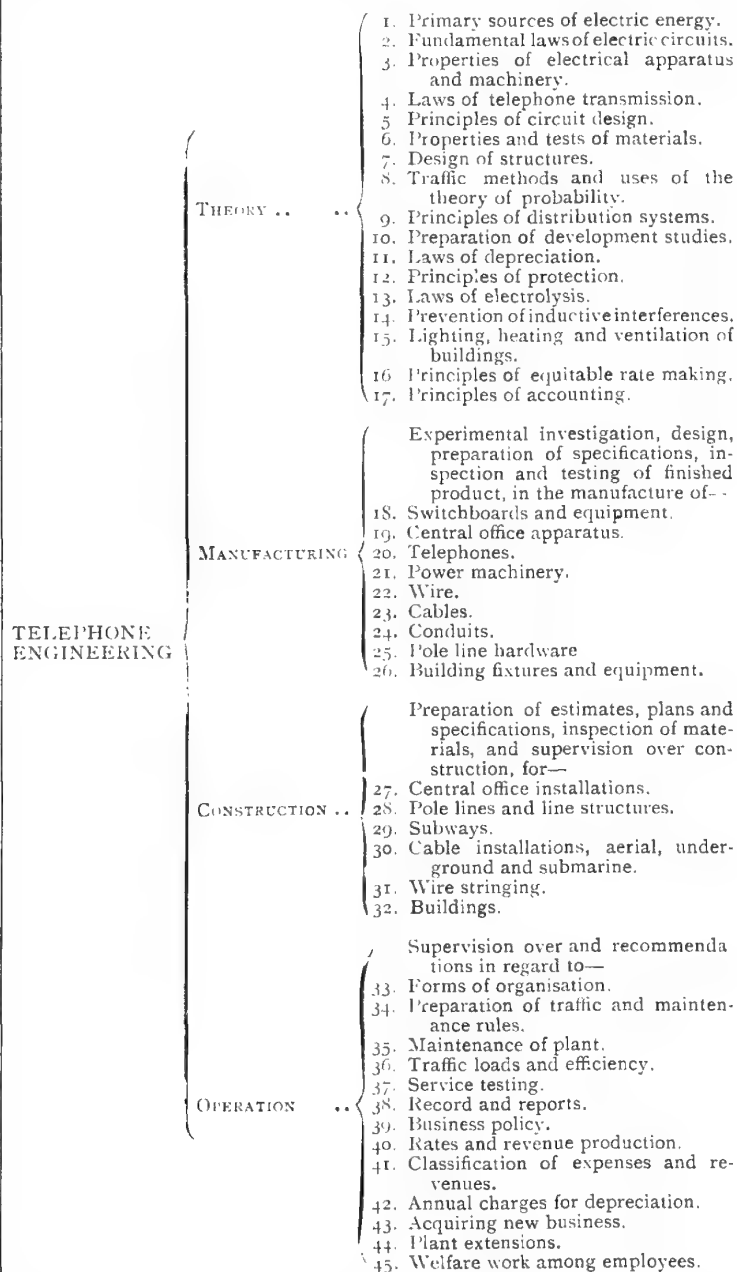


FIG. 1.—CLASSIFICATION OF THE FUNCTIONS OF THE TELEPHONE ENGINEER

of Mechanical Engineers and the American Society of Civil Engineers. These societies admit to full membership only such men as are qualified, in the judgment of their contemporaries, by education, training and experience, to take full charge of responsible engineering work. By common consent the professional definition of an engineer may be substantially expressed as follows:—

1. One who possesses a degree received from an engineering or technical school of recognised standing, or the equivalent of technical education; and
2. One who possesses an amount of training obtained in practical experience sufficient to qualify him to take responsible charge of work in his special field; and hence to qualify him for



3. Full membership in one of the recognised engineering societies of the highest standing.

There is no national telephone engineering society, and telephone engineers therefore fall in the broad class of electrical engineers, being eligible for membership in the American Institute of Electrical Engineers. The practical experience necessary to qualify a graduate to take responsible charge of work varies probably from seven to ten years, depending of course upon the individual.

The professional standing of individual engineers will always depend in great degree, of course, upon their individual achievements and attainments, as these become publicly known. It is also affected by their connections with professional bodies and by the estimates of their contemporaries. Telephone engineers are unfortunate in the respect that they have no national organisation, and for that reason are often not well known. For the same reason, too, the character and importance of their work are not as well known as they should be. Hence it appears desirable to go into the scope and nature of telephone engineering quite fully.

#### *Telephone Engineering.*

This field of engineering is fundamentally a branch or offshoot of electrical engineering, with which it has a good deal in common; and is also related in not a few of its elements to civil engineering. For example, the theory of telephone transmission is evolved from the same fundamental laws as the theory of power transmission, but the final results are profoundly different. The theoretical side of telephone engineering is in general much more complex than other branches of engineering, and requires skill of a high order to handle it properly. The construction side is highly special, in reference particularly to apparatus and central office installations. The operating side also presents problems that are largely special in their character, relating to maintenance and traffic.

The functions of the telephone engineer are so numerous that in order to make them most clear they have been classified and arranged in a skeleton form of diagram, as shown in Fig. 1. This diagram necessarily indicates at the same time the breadth and scope of telephone engineering, both in theory and practice. The whole engineering field has been separated into four parts: Theory, Manufacturing, Construction and Operation; each of these branches has then been classified in considerable detail. The division of Theory is intended to show the scope of theoretical knowledge which the telephone engineer is called upon to apply in the course of his practical work, and upon his knowledge of which will depend his own efficiency and effectiveness. The division of Manufacturing is intended to show the scope of his usefulness in the manufacturing field. The division of Construction requires little explanation, as perhaps it is the most commonly accepted field of the engineer's activities. The division of Operation is a sphere of the engineer's usefulness which is probably not appreciated among telephone managers to the extent that it ought to be. It has too often been the case that the engineer was dispensed with as soon as the plant was built, and perhaps regarded as a luxury even before this time. As a matter of fact, his services are needed fully as much during the operation of the plant as during its construction.

But every business man will apply to engineering the same test that he applies to all other facilities, services or equipment for the transaction of his business—namely, is it necessary, and if so, does it pay for itself? The engineer must frequently justify his existence, and he cannot shirk the duty of proving that his services are of constant and lasting benefit to the industry, if he hopes to receive proper recognition and reward.

(To be concluded.)

**Local Telephone Societies.**—With reference to the particulars of telephone societies given in last month's JOURNAL, it should be observed that the percentage of attendance of the Nottingham Factory Society was 52.5 and not 42.9; also that the figures of the West and North-East London Societies were transposed. The percentage of attendance for the former is therefore 31.7.

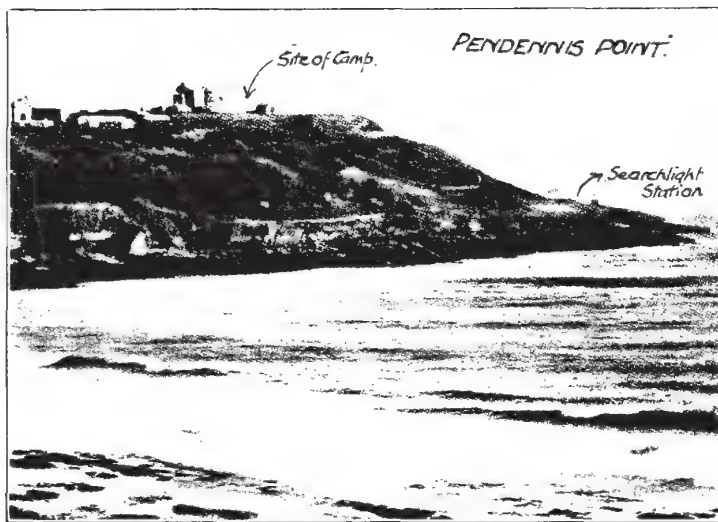
## UNDER CANVAS WITH THE ELECTRICAL ENGINEERS TERRITORIAL FORCE.

By HARVEY SMITH, *Metropolitan Engineer's Department.*

It has been suggested to me that one of the chief reasons which deters many would-be Territorials from joining is the fact that annual training in camp is compulsory. There seems to be an impression that the military discipline, coupled with the discomforts camp life entails, must be particularly irksome to the raw recruit hitherto unused to such luxuries.

So far as the Electrical Engineers corps is concerned, the reader is asked to judge for himself, after reading these notes, whether the impression is justified. My own experience of a first year's camp in the corps proved particularly enjoyable. The open-air life, the novel surroundings and general atmosphere of the social, military and technical sides of the camp, combine to make one feel that the short training has come all too quickly to an end.

The Electrical Engineers (London Division) is a branch of the Royal Engineers, and provides detachments to man certain of the various searchlight stations situated at all defended seaports.



There are three main reasons which tend to make the annual training in camp specially attractive—

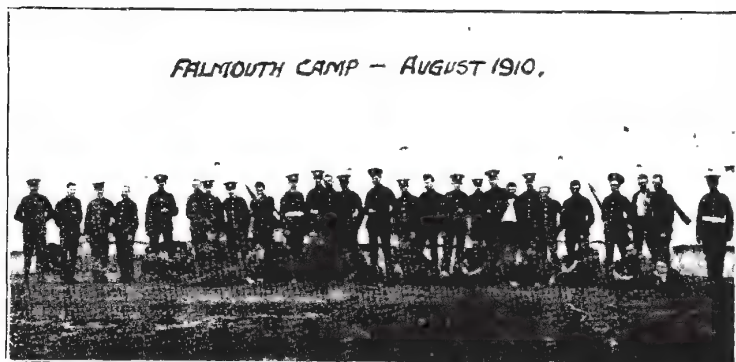
1. Camps must of necessity be formed on the sea coast.
2. The searchlights at each seaport only enable a small number of men to be trained at a time. This necessitates the camps being spread over the whole of the summer months, and each man can therefore choose a time for attendance most convenient to himself.
3. The military side of the training is naturally not so rigorous as in other corps, and the technical training received in handling the apparatus in each searchlight station is of real value, far more than is the knowledge gleaned from text books.

During the year 1910 camps have been formed at the following seaports: Weymouth, Plymouth, Harwich, Sheerness, Dover and Falmouth. It was my good fortune to be sent to the Falmouth camp, and these notes are intended to convey an idea of the life during the short period of training received there. Each camp varies slightly in routine, much depending on the number of officers present and their zeal for military *versus* technical training.

Those who know Falmouth will appreciate the unique position chosen for the site of the camp, viz., on the high ground of Pendennis Point, overlooking the Castle Drive. To quote the words of the guide book:

"The view from the hill, overlooking as it does the bay, harbour, St. Maw's River, the River Fal, Penryn River, Flushing and Falmouth Town, and the undulating panorama of country, is unrivalled even in Cornwall."

The recruit's first night under canvas is usually considered to be a somewhat sleepless one, due no doubt to the novelty of his position. In my own case, however, no difficulty was experienced, the regular wash of the breakers on the beach below making a most excellent soporific. The regulation Army bell tent is, I believe,



intended to accommodate ten occupants under ordinary conditions, and I am afraid I should consider it fairly well packed at that. What it must have been during the South African War, when as many as 30 were told off to one tent, must be imagined; personally I considered that with the four other occupants who made up the complement of my own tent we were quite comfortable and desired no further company.

Each bed consists of a waterproof sheet laid on the ground on the top of which is laid in succession a straw mattress, pillow and three blankets. These, with an overcoat thrown over the whole, form ample protection against the cool night air. Unfortunately, the Government does not appear to cater for men over 5 feet 6 inches or so, and, if over this "standard" length, one's toes have a habit of creeping out of cover during repose. Such small inconveniences as earwigs, etc., soon become insignificant; indeed, without the usual "earwig hunt" prior to getting between the blankets, one of the excitements of camp life would be lost.

*Reveille*, or its equivalent, is usually at 5.30 a.m. The energetic man, however, who has had the forethought to clean his equipment overnight turns over with a self-satisfied smile for an extra half hour's sleep, for the first parade of the day is not until 7 a.m. A high standard of cleanliness is required at this parade, which is of an hour's duration and acts as an appetiser for breakfast. Boots must be brushed, belts, etc., must be "blancoed." Buttons must be polished and rifles must be cleaned, and a spectator walking through the camp at 6.30 a.m. would be very much impressed with the zeal and energy with which each man polished, brushed or rubbed.

Breakfast follows at 8 a.m. after which a rush is made for the tents, for each man's bed must be rolled up and the tent thoroughly tidied. The untidy bachelor learns during his "camp" the value of neatness if he learns nothing else, for there is usually considerable competition amongst the various tents for the "tent prize" awarded to the best kept tent during the camp, and it is surprising how quickly a man's untidy habits are eradicated.

The morning parade is generally from 9.30 a.m. until 12.30 p.m. This is a technical parade and consists of actually working the searchlights under service conditions, tuning up, as it were, for the night run. The arc lamps used for the searchlights are of a very large type. Each lamp is supplied with current from a separate dynamo, which in turn is driven by a 25 horse-power oil engine. The searchlight station consists of an engine room containing the engine and dynamo, and an emplacement containing the arc lamp. Each separate station is controlled by telephone and motor connections to a common directing station from which all the instructions for running are received.

The arc lamps used are of the horizontal carbon type, 38 mm. positive and 26 mm. negative. The current used can be as much as 150 amperes at 60 volts and the light obtained is so powerful that it is difficult to ascertain its candle power. It has been roughly estimated at 40,000, but is probably more than this.

Adjustments made to the carbons are under cover of a darkened

glass screen as the intense light would be very harmful if allowed to fall on the naked eye.

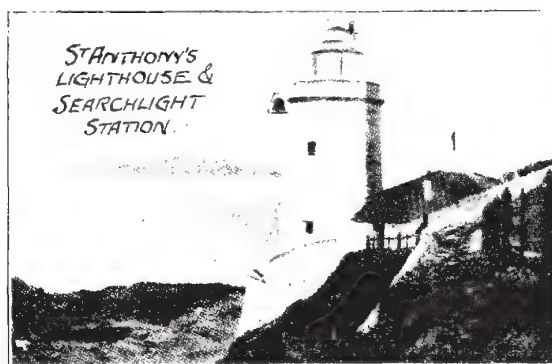
The emplacement being usually right on the fringe of the coast the men in charge of the lamp are fortunate in working with the continual smell of the briny in their nostrils. In stormy weather the lookout must be grand indeed with the huge waves breaking on the rocks below and dashing the spray high in the air.

Needless to say at the end of a morning parade one has obtained a thorough appetite for dinner. It is usual for the afternoon to be free, prior to an all-night run of the lamps, and it is on such afternoons that the true delights of camp life are realised and appreciated. The least energetic stretch themselves on the shady side of their tent and while the hours away in smoking or "yarning." Those whose spirits are more buoyant provide a free entertainment by organising "bear baiting" or "cock fighting," but the majority wend their way with towels down to the rocks below. After a morning's turn with engine or lamp (during which needless to say a fair proportion of grease, oil and carbon dust is picked up) there is nothing more enjoyable than a plunge in the clear water from the top of a suitably placed rock. The Cornish coast is noted for the clearness and colour of the water.

If no night run with the lights has been arranged the afternoon is generally devoted to military drill, only this time of a more interesting nature, consisting of skirmishing and practice in the use of cover, etc.

An "all-night run" is an experience well worth any discomfort experienced, more especially when the men are told off into "shifts." Each man parades with a blanket and marches or proceeds by boat to his separate searchlight station. He is then instructed as to the time his shift commences and the light he is stationed on, and is turned adrift to obtain his precious few hours' sleep. On one occasion I and my fellow lamp-man had to resort to the cold comfort of the bare rocks, and in fear of oversleeping ourselves we carefully gauged the progress of the incoming tide, and so arranged our position on a comfortably hollowed-out rock that the spray from the advancing waves would prove an effectual "alarm." As it happened the efficacy of our arrangement was not put to the test, for the unique situation was not at all conducive to sleep of a sound nature.

Constant attention is required once the lamps are under weigh, as on no account must the light go out unexpectedly. The beams of light from the arc are traversed (viz., moved along their allotted path) by means of motors coupled to the projector and controlled from the directing station. Standing behind the lamp and looking along the direction of the beam one realises how difficult it would be



for any hostile vessel to enter the harbour. The effective range of the light is 1,500 to 2,000 yards, and the different beams from the various lights are so traversed that the whole harbour is well explored. Each object on which the beam falls is brought vividly into relief, forming a splendid mark for the gunners in the fort behind. It is customary to traverse the beams as quickly as possible back to their first position once the sweep is over, the outward motion being done slowly in order that the surface of the water can be well explored. By these means a vessel can be prevented from creeping into the harbour behind the light as



would be the case had the traverse been of slow speed both outward and inward.

The lamp men are protected in a measure from the shells from an attacking force by the stout concrete base of the emplacement.

Sufficient perhaps has now been said to show that a Territorial soldier's lot in the Electrical Engineers is by no means an unenviable one. The position of the camp makes the life as healthy as one could wish. The pay of 1s. 8d. per day upwards while in camp supplies a certain amount of pocket money; the work is of an extremely interesting and useful nature; a sufficient amount of leisure is given to prevent any complaint of overwork; and last but by no means least, there is the feeling that one is fulfilling a duty owed by every loyal Briton to make himself efficient for the service his country may at some future date require from him.

The reader, if interested, is requested to refer to Mr. Grinstead's article in the January, 1909, JOURNAL, which gives further information with respect to the general work of the corps throughout the year.

### TELEPHONE WOMEN.

#### LXXVI.—HARRIET MARTHA YEATES.

MISS YEATES, the Clerk-in-Charge of Portsmouth, joined the service early in 1894. She has served under six district managers, and, amongst other things, remembers the time when pole-changers were in use in exchanges. This fact is more



HARRIET MARTHA YEATES.

especially impressed on her mind as on one occasion when the ringing failed inquiries were made, and it was found that the caretaker had stopped the pole-changer because the noise it made interfered with the slumbers of her infant. In the early part of her time it was no uncommon thing for the operators to have a book or a piece of crochet work to beguile away the intervals between calls, but the conditions under which operators now work have changed entirely and have improved both as to pay and hours of work.

Miss Yeates has no particular hobby, but takes a great interest in the staff, and four years ago she started a very successful thrift club amongst the operators. In 1905 she served several months in some exchanges in the Metropolitan area, and Portsmouth profited considerably by the experience which she gained there.

#### LXXVII.—CONSTANCE HORNER.

As an organisation practically indispensable to the whole business community, the telephone business is young, but as proof of its progressive nature the earlier experiences of those who have been in the business even for a short time, read like ancient history.



CONSTANCE HORNER.

Miss Horner, who is the Senior Supervisor at Leicester Central Exchange, entered the Company's service in January, 1893, and has continued therein without a break. She was the fifth operator to be engaged at Leicester, when the exchange was situated in the top rooms of Exchange Buildings, Rutland Street, and there were less than 400 subscribers connected. The service was overhead earth circuit and there was no sub-exchanges, and therefore no junctions.

Miss Horner has witnessed the removal of the exchange from the original premises to the Company's own building on the opposite side of the same street, and the growth of subscribers from 400 to nearly 4,000. Metallic circuits underground have replaced the old circuits, and ten sub-exchanges, served by some 40 junctions, have grown up round the central.

Leicester was formerly part of the Nottingham district, and so Miss Horner has served under as many as five district managers, viz., Messrs. Bennett, Cook, Williamson, Sibley and Ashton.

The outstanding feature of Miss Horner's disposition is gentleness, and she is particularly successful in dealing with irate subscribers. Kindness is the main note in her dealings with her subordinates, and however exacting the circumstances may be, either in regard to subscribers or staff, she never loses her temper. She holds the esteem of her superior officers and is worthy of a place in our gallery of "Telephone Women."



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"BY THE STAFF FOR THE STAFF."

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VOL. V.]

OCTOBER, 1910.

[No. 55.]

### SOME OCTOBER REFLECTIONS.

ALTHOUGH Jan. 1 is the official commencement of the New Year, the date on which resolutions are made, and new leaves turned over, and alas! so often soon blotted again, there is probably some date between Sept. 1 and Oct. 1 wherefrom busy folks could most fittingly date the beginning of their new year. It is about this time that they and their staffs come back into the battle of industry with revived energies and hopes to plan and work almost unremittingly until the quieter days of the following August. The telephone man forms no exception to the rule. With the beginning of October the tide of business is in full flood and shows little signs of ebbing until the next July. The telephone service—like those sacred temple lamps which are never permitted to go out—is continuously alive day and night, summer and winter, and the operators may not inaptly be compared to those vestal virgins whose duty it was to keep the flame alight. But, putting metaphor aside, although even the holiday season makes its claims on the telephone, and, indeed, in seaside and other resorts an increased claim, yet in August and September there is, generally speaking, a lull (partial and varying in degree, but still sufficient to be noticeable) in the activities of the year. The successive absences of colleagues and clients on vacation make themselves felt, until at length one's own holiday makes the final chasm which separates 1908-9 from 1909-10 or 1910-11 from 1911-12. But these comparatively quiet days are past again, and the gigantic task of the staff appointed to take an inventory of the Company's plant looms before us.

The interesting article on an engineer's training and qualifications, by Mr. FRANK FOWLE, which we reprint from *Telephony*, and that by our contributor "P. T. W.," on education, reminds us that at

this time of the year the telephone societies commence their sessions—another proof, if any were needed, that October begins the telephone man's year. A scheme of prize competitions similar to those which were productive of such excellent papers last year is again announced, and some particulars of it are given elsewhere in our columns. The words "education," "higher education" and "technical education" are become familiar in our mouths as "household words." They form an ever-present subject of discussion in Press and on platform, and must continue to do so while deficient education continues to be a national failing. We need not repeat our appreciation of the good work which the telephone societies and correspondence classes are doing; we only urge members of the staff to take full advantage of them. Mr. FOWLE in making out a strong case for the importance of the status of the telephone engineer requires of him a range of knowledge truly encyclopaedic. The realm of telephone engineering, so far from being narrow, is wider than most other branches of engineering. The telephone engineer in addition to being an electrical expert must have a considerable knowledge of civil engineering, building, lighting and heating, and be something of an accountant and financial expert.

Real education—whether technical or general, whether in science or letters—is that kind which is continuous and pre-eminently voluntary. Opposed to it is that forced kind which has for its objective the passing of an examination and there ceases. For all the broader purposes of culture and self-development it is absolutely useless. It may qualify a man for entry into this or that service, but it will carry him no further. One becomes increasingly familiar with a type of educational advertisement making resplendent but crudely worded offers, such as "We secure you a good salary," "More knowledge means more pay," and so forth. We will indulge in no cant about despising money and the power for social improvement it carries with it; we know that everyone hopes and desires to see his efforts rewarded by an increase in salary. But it may be said at once that he whose every hour of study is dedicated only to the hope of pecuniary gain, who touches on no subject except it seems to promise more pay, who in fact eschews all knowledge as labour lost unless he can see it paying tangible interest on the mental capital he expends, has a mistaken sense of the value of education and is probably foredoomed to disappointment. Knowledge pays an abundant interest on the mental capital to which we have referred; but it must be acquired generously and for its own sake. Then it will bear fruit in the immediate and certain ripening of a man's mental powers which must inevitably react on his earning capacity.

### OPERATOR AND PUBLIC—ANOTHER SIDE.

To arrive at the golden mean seems strangely enough to be one of the permanent insoluble problems which never cease to afflict the world. The relations of telephone operator and public form no exception to the rule. Not long ago we had occasion to refer to the extraordinary decision of an American judge, that a telephone company had no right to dictate what language a client should use over their wires—even when he insulted the operator. Now a paragraph is going the rounds of the Press to the effect that in a town in East Prussia, a genial and much-respected citizen

after being kept waiting at the telephone for some time ventured mildly to remonstrate with "my dear girl." For this "insulting expression" to the operator, who of course is a government official, he was served with a notice of police proceedings and is understood to be awaiting the direst penalties. There would thus seem to be a ludicrous disparity between the practice of two civilised countries, when in one case the subscriber is free to affront the operator and in the other the telephonist can tyrannise over the citizen—for that of course is what this extreme sacredness of the person of the official portends.

## SECOND INTERNATIONAL CONFERENCE OF ENGINEERS OF TELEPHONE AND TELEGRAPH ADMINISTRATIONS.

THE Second International Conference of the Engineers attached to the Government Telephone and Telegraph Systems of Europe was held in Paris from Sept. 4 to 10.

The conference was presided over by M. Estaunié, the Director of the Telephone Administration of France. Among those present were Dr. Breisig and Dr. Strecker (Germany), Herr Arthur Linniger (Austria), MM. Roosen and Colson (Belgium), M. W. G. Thomsen (Denmark), MM. Bordelongue, Seligmann-Lui, Devaux Charbonnel and Bouchard, Engineers-in-Chief of Telegraphs, and M. Milon (France), M. A. E. R. Collette (Holland), MM. Kolossvary, J. Höllös and Béla Gáti (Hungary), Professor di Pirro (Italy), M. Iversen (Norway) and MM. Landstrom and Carl Egner (Sweden).

The British Post Office engineers present were Major O'Meara, Messrs. A. J. Stubbs, J. E. Taylor, F. L. Henley, F. Addey, H. R. Moore, H. Brown, and J. G. Lucas.

In addition to the engineers of the Government Administrations, certain others attached to commercial organisations were invited, among them being Dr. Ebeling of Berlin, Mr. J. J. Carty, Engineer-in-Chief, American Telephone & Telegraph Company, Mr. C. E. Scribner, Engineer-in-Chief, Western Electric Company, and Mr. Gill, Engineer-in-Chief of the National Telephone Company.

Six questions upon which papers had been prepared were discussed at the conference. On the first of these—"Manual *versus* Automatic Switchboards"—the interesting point of the discussion was a speech by Mr. Carty in which he dealt very forcibly with the necessity of working out a clear fundamental plan providing for the future growth of the whole system, before any attempt was made to discuss the switchboard situation. He emphasised very strongly the necessity of testing any proposition for equipment by considering how that equipment would work as a part of the completed organisation contemplated by the fundamental plan. He pointed out that the expression "automatic *versus* manual" was very misleading, because in the so-called manual system there were many automatic operations and in the so-called automatic system there must be, unless the system became impracticable, a great many operators. The advocates of the manual system therefore admitted the possibility of a large amount of automatic work and the question roughly was, where was it best to employ the manual labour and where the automatic apparatus. He summed up by saying that he had made a very large number of most careful investigations, and so far, he had not found any so-called automatic system which would successfully conduct the telephone service. After Mr. Carty's speech there was very little discussion.

The second question was the very important one of the standardisation of telephone measurements, and it was agreed that for calculations, the telephone current should be considered as being composed of a pure sine wave current with a frequency constant of 5,000, *i.e.*, a frequency of roughly 800 periods per second. It was also agreed that it was desirable from an international point of view to have a term of comparison in which the efficiency of a circuit could be expressed, and it was agreed to use for this the

attenuation length, *i.e.*, the attenuation constant multiplied by the length. It was further agreed that with the apparatus in use and in the case of an ordinary copper aerial line joined directly to the apparatus the relation between the attenuation length and the audibility of the speech might be regarded as follows:—

	Attenuation length.			
Very good ... ..	...	...	...	2.5
Good ... ..	...	...	...	3.5
Practical limit ... ..	...	...	...	4.8

It was agreed that a further study was necessary to define the attenuation length for other uniform lines and for non-uniform lines, and generally that the whole matter should come up again at the next conference for verification. It was also agreed that a committee should settle the actual apparatus by which the attenuation length should be measured.

[The above is open to considerable criticism and the practice which the National Telephone Company has observed for many years is much more precise and complete; but since the effect of the above paragraph is to make the resolutions rather tentative than absolute the matter will no doubt be completed satisfactorily later on. The relation between the standard mile and the attenuation length is as follows:—The Company's standard cable has an attenuation length of 1.07 and therefore if the decimal place of a cable reading is moved one to the left, this reading will be 7 per cent. too low, *i.e.*, 30 miles of standard cable has an attenuation length

$$l a = 3 \times 1.07.]$$

In the discussion on long distance telephony the main feature of interest was the contribution by Mr. Carty dealing with some of the recent American work. He stated that an underground cable was projected between New York and Washington and another between New York and Boston.

He stated also that the difficulties connected with the loading of No. 8 open wire had been altogether overcome, and that practically every long telephone line in the country had telegraphs superimposed thereon, and also that increasing use was being made of phantom (superimposed) circuits for telephone work, and he repeated the information known already to many of our readers, but apparently new to many members of the conference, that the efficiency of the phantom circuit is considerably greater than that of the side circuit, and also greater than the straight circuit would be without any superimposing coils in it.

He stated that up to recently they had to make a choice between having a circuit loaded or phantom. Recently, however, it has become possible to load the side circuits and also the phantom circuits. This undoubtedly marks a great advance, and should do much to extend the distance between towns over which speech can be conducted at economical rates.

In the discussion of new processes for the preservation of poles, the chief feature was a new method employed by the Hungarian Administration for getting the creosote into that part of the pole where likely to do the most good. From the butt of the pole to a distance a little above the ground line a series of holes are made by piercers so constructed as to merely separate the tissue without breaking it. The poles are put into the tanks, and it is said that a shorter time than usual allows the creosote to get into the wood to a greater depth in the butt section than by the usual process.

There were also discussions on the co-existence of strong and weak current lines and on multiple telegraphy.

WE understand that it is proposed to offer the same premiums for papers read before the telephone societies as were offered last year. The delay in the awarding of these premiums has been caused by the number of papers submitted, which have given the examiners a very much more difficult task than was originally anticipated.

In announcing the premiums for the ensuing season the committee wish the attention of secretaries and officers of the various societies drawn to the necessity which exists for complying strictly with the rules, as a considerable amount of difficulty has been caused through neglect of these rules in the past season.

### THE PUPIN SYSTEM APPLIED TO AERIAL TELEPHONE LINES.

DR. EBELING in the *Electrotechnische Zeitschrift* gives particulars of some trials which have been made of the Pupin system, which has already been used with excellent results in telephone cables, on aerial long-distance lines in Germany. Most of the trials were made by the Siemens & Halske Company with the co-operation of the Imperial German Post Office.

#### Protection against Lightning.

The first question to be considered was whether on the insertion of induction coils in aerial lines the apparatus would be capable of resisting electrical discharges. As a good permanent state of insulation plays a large part in aerial lines, it was decided not to

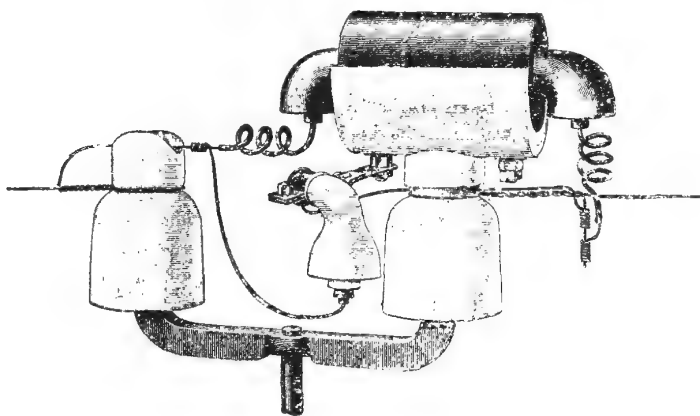


FIG. 1.

employ arresters with earthed connections, and preference was given to an apparatus short-circuiting the coil. This apparatus was mounted in a primitive fashion on the Berlin-Magdeburg line (see Fig. 1) and worked very well. Only the arresters were damaged by lightning and not the coils, although the discharges

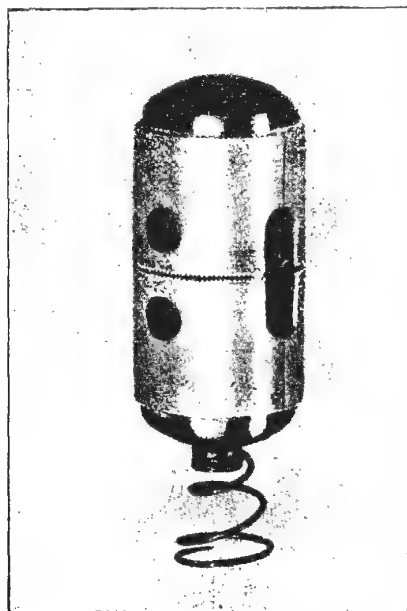


FIG. 2.

were sufficiently strong to fuse the line wire. Consequently lightning arresters have been regularly employed on pupinised lines and the apparatus has always been an arrester mounted in parallel with the coil. The external form has changed in course of time

but the principle has always remained the same. Fig. 2 shows the vacuum arrester as it is used to-day. It will be seen that it is completed by a rudimentary arrester formed by the metal cylinders prolonging the two metallic caps and leaving only a small space

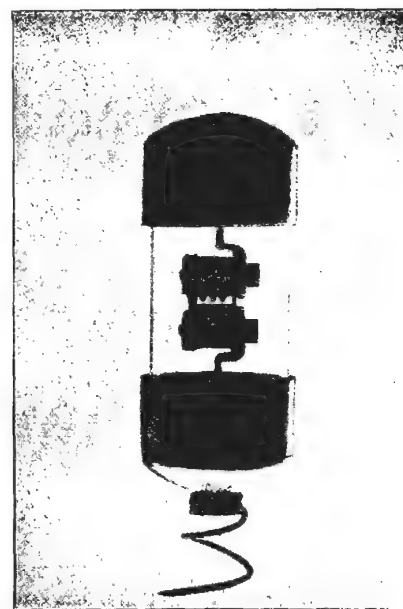


FIG. 3.

between them. The edges of this space are pointed so as to form the points of the arrester. This rudimentary form of protector has been chosen because the coil is protected as far as possible, even when the glass covering is broken by a violent shock of lightning. In this case the spring of the vacuum arrester approaches the metal cylinders and short circuits the coil in such a way that any new strokes of lightning are unable to damage it. Fig. 3 shows the vacuum arrester alone and distinguishes the internal parts.

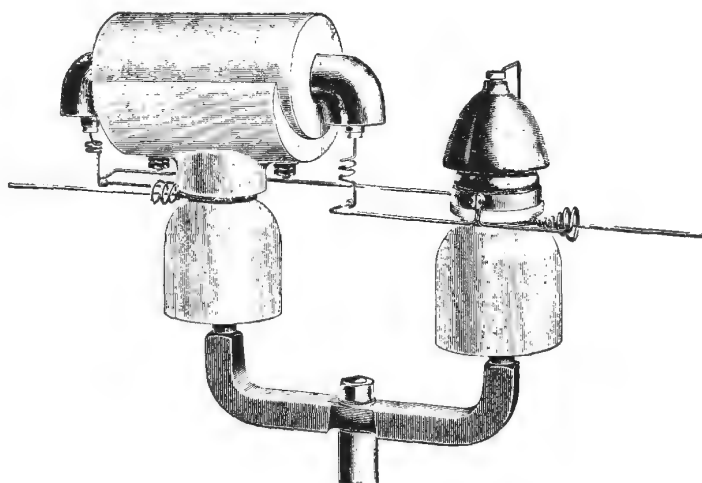


FIG. 4.

#### Lines with Single Coils.

The first aerial lines were provided with single coils on the A and B circuits. This was because it was desired to set up as simple conditions as possible and avoid difficulties of insulation and derangements which might have occurred if the A and B wire had been introduced into the same apparatus.



*Coils Enclosed in a Cylindrical Elongated Covering*—Berlin-Frankfort-on-Main line (first equipment). It was decided to equip a line as long as possible so as to give the Pupin system a fair trial, the first line experimented on (Berlin-Magdeburg) being only 150 km. in length. A new bronze wire 2.5 mm. in diameter was run on the Berlin-Frankfort route—a distance of 520 km. (about 360 miles).

This trial promised to give results all the more interesting in that there existed between the two terminal points one line of 4 mm. bronze and another of 5 mm. which could be compared with the trial line. The 4 mm. line was of the same length of 580 km., so that the results obtained could be determined exactly, while the 5 mm. line which was run on a different route was 540 km. in length. All lines were double wire.

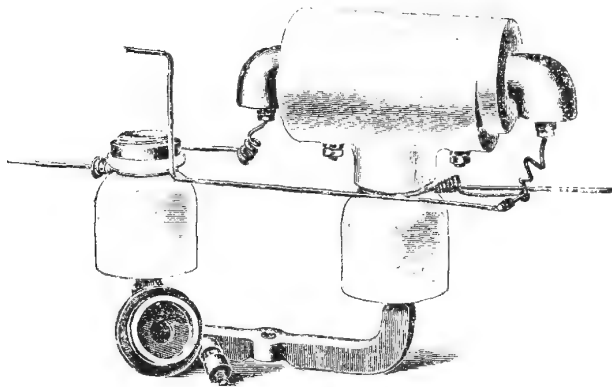


FIG. 5.

The coil cases, placed at every 5 km. along the lines, had in general the same form (Fig. 4)—that employed in the Berlin-Magdeburg line. The cylindrical coils had a core and an envelope of special magnetic material by which they were surrounded and in which the two outgoing sleeves were fixed. It was thought necessary to be particularly careful in the first aerial line of any great length that the material of the iron core should not produce at higher frequencies greater losses which would destroy good transmission of the voice. The permeability of this iron was, certainly, relatively slight, but great enough to produce sufficient self-induction.

The lightning arrester, which was fixed on a second insulator, was of novel form. The vacuum arrester was placed in an ebonite bell which could be easily unscrewed. Fig. 5 shows the apparatus with the arrester open. Fig. 6 shows the coil case on the arms of the pole.

The line was first of all run entirely without coils, so that the results given by the line without coils could be ascertained. But the points where the coils were to be placed were marked in advance and measures were taken that the fixing of the apparatus could easily and rapidly be made.

Attempts at conversation on the three above-mentioned lines were then made, and it was found that the volume obtained on the 4 mm. and especially on the 5 mm. line were, as might be expected, considerably greater than that of the trial line before the fixing of the coils.

The coils were at length fixed on the trial line and attempts at conversation were made. The line with the greatest volume was still the 5 mm. line of 540 km. length. Then came the Pupin line with volume slightly weaker, and lastly the bronze line of 4 mm. The relation between the values of the volume on the three lines varied slightly on different days, due to the variable quality of the insulation of the lines; but generally the relation remained the same.

The results obtained by the trial conversations correspond in their results with the values given by calculations. For a long telephone line the product of the attenuation constant and the length of the line would form a basis. Neglecting the leakance—which is permissible since the insulation of the lines during the

trials was at least 10 megohms—the value of the co-efficient of attenuation for the lines without coils is given by the equation

$$\beta = \sqrt{p \frac{C}{2} \left( \sqrt{p^2 L^2 + R^2} - p L \right)}$$

$C$  being the mutual capacity  $R$  and  $L$  the resistance and the inductance of the loop per km., and  $p = 2 \pi n$ ,  $n$  being the frequency.

For the loaded lines this equation takes the following simplified form:—

$$\beta = \frac{R_1}{2} \sqrt{\frac{C}{L}}$$

in which  $R_1$  represents the resistance per kilometre value of line + coils.

The effective resistance of the different coils was about 8.7 ohms, and the self-induction about 0.11 henry. As the coils were placed at intervals of about 5 km., the fifth part of these values should be introduced into the calculation. The following table



FIG. 6.

contains the numerical values employed for the electric constants of the lines obtained at 900 periods:—

- (a) Effective resistance in ohms per kilometre of loop.
- (b) Inductance in henries per kilometre of loop.
- (c) Mutual capacity per kilometre in microfarads.
- (d) Attenuation constant.

Lines.	a.	b.	c.	d.
Bronze line of 5 mm. ...	1.92	186.10	0.0063	0.00176
" " 4 mm. ...	3.00	194.10	0.0050	0.00262
" " 2.5 mm. without coil ...	7.70	214.10	0.0055	0.00591
" " 2.5 mm. with coil ...	11.18	4.610.10	0.0055	0.00193

All these values should be considered as theoretic data. Relatively to the value of  $\beta = 0.00193$ , the pupinised line corresponds to a line without coils of 4.7 mm. of diameter.

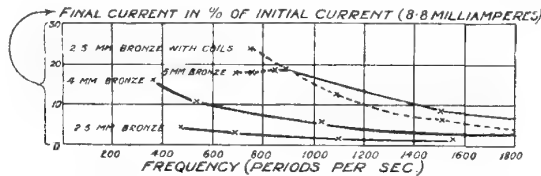


FIG. 7.

As the length of the 5 mm. line is about 540 km., and that of the other line is about 580 km., the following value is obtained for the product of the attenuation constant and of the length:—

1. For the line of 5 mm. ...  $\beta l = 0.95$
2. " " 4 mm. ...  $\beta l = 1.52$
3. " " 2.5 mm. without coils  $\beta l = 3.43$
4. " " 2.5 mm. with coils ...  $\beta l = 1.12$

The smaller the value of  $\beta l$  the greater the strength of the line. that is to say, the greater the intensity of transmission. It is generally said that a line permits good talking when the value of  $\beta l$  does not exceed 1.5, and that the talking is still efficient when  $\beta l = 2.5$ . The value of  $\beta l = 1.52$  for the 4 mm. line, and indicates that this line reaches the limit of good talking; the line of 5 mm. and the pupinised line of 2.5 mm. are beneath this limit, the corresponding values being 0.95 and 1.12. Their power may therefore be considered as very good. On the other hand, that of the 2.5 mm. line, without coils, of which the value of  $\beta l = 3.43$  may be considered as inefficient. It approaches indeed the limit of practical communication, which corresponds to  $\beta l = 3.5$  to 4.

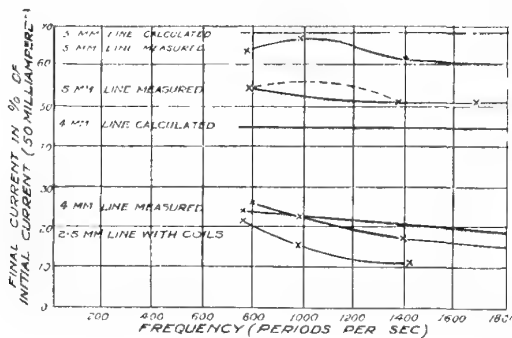


FIG. 8.

In all cases the values of  $\beta l$  show that the 2.5 mm. line, not equipped, has an effective volume well below that of the bronze line of 4 mm., whilst the volume on that line, equipped with coils, was stronger than that of the 4 mm. line, but inferior to that of the 5 mm. line. It will be seen, consequently, that the results determined by the values of the line and the coils agree with those which were obtained in the trial conversations.

When during the trial conversations the ordinary lines were joined up with the Pupin line and to the other trial lines, it was noticed, especially when the joined-up lines were short, that the power of the Pupin line diminished slightly in comparison with that of the ordinary lines. In certain cases the Pupin line was no longer noticeably superior to the ordinary 4 mm. line. This attenuation of sound which arose without doubt from the effects of reflection, could be diminished in certain cases by the employment of appropriate transformers. It might be said that the bronze line of 2.5 mm. equipped with coils, was at least equivalent in all cases to a line of 4 mm., and that the volume on that line exceeded very noticeably that of the ordinary line of 4 mm. when the local lines were joined up to the two extremities of the line.

Measurements by dynamometer were likewise made of the line.

The results of these measurements are indicated in Fig. 8. The final current corresponding to a constant initial current of 8.8 milliamperes was measured at different frequencies between 600 and 1,800 periods. The curves showed very nearly the values corresponding to the results obtained in the trial conversations.

These values cannot be scientifically utilised for various reasons. Firstly, the dynamometer employed was not adapted for such measurements because its resistance and self-inductance were relatively great: they were respectively about 400 ohms and 0.4 henry, but for this reason it resembled a telephonic station, that is why the values obtained appear to us instructive. Further, the intensities were much too strong, which is important in relation to the line equipped with coils, because the effective resistance at high frequencies was much more considerable than in the case of telephonic currents.

In all cases the curves show that the bronze line of 2.5 mm., which is much inferior to the 4 mm. line when it does not include the coils, become more powerful when equipped with coils and then takes rank between the bronze line of 4 mm. and that of 5 mm.

All the curves fell considerably at high frequencies, but that was due to the dynamometer and not to the lines. This will be understood if one considers the impedance of the dynamometer

$$\sqrt{R^2 + (2\pi nL)^2} \text{ for } n = 900 \text{ and } 1,800$$

attains a value of about 2,300 and 4,500 ohms against a value of 400 ohms at 0.4 henry for the direct current resistance.

These results naturally did not give us full satisfaction. Therefore we were obliged to employ a final apparatus offering the smallest losses possible. We used a bolometer to take measurements. It is true that this instrument is not very sensitive inasmuch as it is necessary to employ still greater intensities to obtain perceptible differences. The initial current had an intensity of 50 milliamperes, that is to say that it was five times stronger than with the dynamometer.

Fig. 8 shows the results obtained with the bolometer for the 5 mm. line, the 4 mm. line and the Pupin line; the measurements on the 5 and 4 mm. lines being taken on two different dates. It will be seen that the measurements vary very greatly, particularly those of the 5 mm. line. The values ascertained by the measurements differ also from the theoretic values, i.e., those obtained by calculation, which are represented by a thicker stroke; the difference, indeed, is very noticeable. After what has been said it is not astonishing that the Pupin line gave, with the high intensities which are employed, inferior values to the 4 mm. line. In any case the result of these bolometer measurements was that the heavy fall in the intensity noticed at high frequencies in the dynamometer measurements proceeded from the great resistance and high self-inductance of the dynamometer

(To be continued.)

## ENTHUSIASM AND ENERGY.

BY STERIKER GASSIOT HARE.

THERE is indeed much truth expressed in the article by Mr. A. C. Nick in the September issue of the JOURNAL, upon the subject of "Enthusiasm and Energy"; at the same time one may not agree with him in all points.

Man or youth cannot be made enthusiasts; you cannot coerce or enforce enthusiasm into their system, but you can, if necessary, enforce energy.

I repeat—man or youth cannot be made enthusiastic; there must be something that appeals to one's nature, and if this something touches a certain point or talent possessed, action will take place, enthusiasm will find a vent and energy be produced.

Everyone that is born into the world, male or female, is endowed with a special gift, and all human beings are brought into the world for a specific purpose—viz., for use and not abuse. It is the duty of parents, guardians and all who have the custody of youth to train with wisdom and discretion, teaching the elementary yet most important lessons day by day, duty to God and duty to man. Under such influence and training youth will imbibe divine (otherwise good) inspiration that makes an enthusiast.

As time passes and the mind of youth expands, so the brain becomes active and ambition sets in.

Brain asks: What would you like to be?

Enthusiasm replies: A soldier, sailor, doctor, lawyer, clergyman.

And ambition echoes: So you shall, my boy.

Energy prompts the youth to open his mind, and with a frank heart, pours out his desire to the parent or guardian, who has trained him so far. The wise counsellor will encourage the youth in his ardent desire, and if necessary deprive himself in order that the boy shall have every opportunity of making his mark in the profession he has selected.

With this opportunity the young enthusiast sets forth with energy, and coupled with steady undaunted perseverance, in due time reaches the goal that was divinely inspired in the days of youth.

How many army recruits have become generals in our British Army? Cabin boys to British admirals? Chemist's boys to physicians? Solicitors' clerks to barristers? Mechanics to engineers? University students to archbishops? etc.—and what is the reason of such success? The solution of the problem is, that the enthusiast has not been thwarted but encouraged.

I may be asked: Does not youth often fail even though he may have the opportunities? I admit he does, but failure in such instances, in whatever form it may take, may be due to unfavourable circumstances that present themselves, or undue influences, such, for instance, as alluded to by Mr. Nick in his article. I would go even further than he asserts. There are those who sow that others may reap—in other words steal the honour from the one who has fought for it and to whom it is due.

An enthusiast may succeed if not unduly hindered, and I firmly assert that businesses, and professions in general, would be in a far more prosperous condition if enthusiasm was not stunted as it is at the present day.

Again, there is a class of enthusiasts who are practically dead to work, who have no energy, or rather prefer a little more slumber, a little more sleep. But this type of man is not wanted to-day and to him I say: If you won't work, neither shall you eat.

Lastly, a man may be energetic because the necessities of life compel him to be. What a miserable, pitiable condition—no ambition, no enthusiasm. Well, even such are worthy of sympathy and pity, and I think that in such cases as these with patient dealing and by good example you may possibly lead them in the pathway of enthusiasm. "It is never too late to mend" is an old proverb, and, whatever mistakes one may have made, do not stop and cry over spilt milk.

I would conclude by stating I consider it a good test as to whether a man is entitled to be described as enthusiastic and energetic, to take the attendance book, for twelve months, and note the time kept. If he has been punctual at his post he may claim to be energetic and an enthusiast—otherwise not.

### THREE TELEPHONE SONNETS.

We have pleasure in publishing some sonnets on the subject of the telephone, which were the outcome of a visit to a telephone exchange, by Miss Millicent Murby, who will be remembered by our London readers, as lecturing at some of the entertainments of the Staff Benevolent Society. She is well known to a wider circle in connection with social and woman-suffrage questions.

#### CONSCIOUSNESS.

Could we but view the air invisible,  
A woof of warring atoms we are told  
Our penetrative vision would behold:  
And on the turmoil of this strife ineffable,  
Our inspiration battens: myriad-fold  
We multiply the conflicts there unrolled.  
Sound waves persist when sound's inaudible:  
The ambient air holds indiscernible  
All jarring clangours from all times of old,  
But threaded through as warp of woven gold,  
Fair thoughts and fancies pass innumerable  
Spun by the love that longing hearts enfold,  
Riching the ether by their course patrolled  
With purport of a depth unfathomable.

#### THE FARSPEAKER.

Threading the air, taut-stretched, the copper wires  
Throw back the sunlight in a glint of gold—  
A dazzling screen before their secrets rolled,  
Significant of hidden throbbing fires.  
Not from the housetops we proclaim desires,  
Nor to the world our dearest dreams unfold,  
Though from our gladness, rightly may it hold  
Some cherished loveliness within transpires.  
But when to hear thee I can wait no more,  
Silent—alone—I wake the fairy light  
That flashes forth and links me up to thee.  
And then beyond the intervening roar  
Of noisy streets, a bell calls suddenly:  
A magic glow a sound—and we unite!

#### THE TELEPHONE.

The Exchange—a hive of low-voiced hurrying bees  
Who hover murmuring o'er the flashing keys,  
And their invisible charges try to please  
With honey-sound of the arousing bell.  
The emotions this engenders—who can tell?  
Is it the lover hears? it pleases well,  
And commerce quickens 'neath the eager spell  
That man to man relates, his work to ease.  
But oft the sound is fraught with tragedies,  
And, nerve-racked or debt-haunted, men cry "Peace!"  
To the irritant summons of that knell  
That rouses them to tortures worse than hell.  
Like Norns, the operators never cease  
Weaving, unconscious, human destinies.

### LONDON NOTES.

THE question as to whether the Territorial scheme will prove a success or otherwise is giving rise to much controversy. Some say it will not be possible to raise the number of men considered by Mr. Haldane as necessary; others again think that it would be possible to raise even more than this number.

With a view of finding out what the Metropolitan staff are doing for the Force the Chief Officers have been good enough to ascertain particulars as follows:—

Department.	Number of male staff.	Territorial Force. Officers.	Men.	Per cent.
Metropolitan Engineers .. ..	848	1	40	4.9
Electricians .. ..	522	—	46	9.0
Stores managers .. ..	250	—	4	1.6
Traffic .. ..	227	—	6	3.0
Contract .. ..	100	—	4	3.0
Chief accountants .. ..	150	—	9	..
	2,115	1	104	5.2

Besides the above there are three Territorial Reserve and three Naval Reserve men.

THE percentage of men belonging to the Force is disappointing. Why the number is so small is difficult to get at. It is admitted, of course, that a man must be prepared to make sacrifices. He must give up a bit of his annual holiday and attend on drill nights during a portion of the year, but there are compensations. He has the satisfaction of knowing that he is doing something for his country; his physique is improved; he learns both to give and take orders; he forms many pleasant friendships, and if he joins one of the Engineers corps, which are specially suitable for the Company's staff, he adds to his technical knowledge.

Let us hope that in the future we shall raise the figure of 5 per cent. to something like 15 or 25 per cent. It would be interesting, and possibly it would stimulate recruiting, if the JOURNAL would obtain and publish returns from other districts showing what they are doing for the defence of the country.

THE beginning of the end in the shape of the inventory has come, and October will see many of the Metropolitan staff away in the country. Well, we wish the chosen ones good luck and good weather, and we have no doubt they will be able to give a good account of themselves in the "wilds." Some of their experiences should make good copy for "London Notes," and we shall be glad to hear from them.

HORTICULTURE has many votaries amongst the Metropolitan staff. After a strenuous day in the City, it is pleasant to get "back to the land," even if one never succeeds in growing anything really well except weeds. However, we have at least one expert; to wit: Mr. W. Bower, of the Western Fitting Department. A recent issue of the *Hackney and Kingsland Gazette* announces that on Sept. 5, at Dalston Amateur Dahlia Society, he carried off four first, one second, and two special prizes, and at the Middleton Show on the following



Saturday, he captured two first, one second, two third, and also a special prize for the best bloom in the show. We congratulate Mr. Bower.

ON Sept. 3rd the North-East Division held their annual beanfeast. They journeyed to Clacton-on-Sea where they dined at the "Hotel Central," and then took to boating, bathing and various games in the afternoon. Mr. C. E. Tattersall was the prime mover and seems to have done things in his usual style. On being questioned as to what sort of a time they had, he replied that they had an excellent day and everyone caught the train home. There have been times when on the festive occasions more than one man has missed the train home.

We presume that the inventory will prevent for the present the final in the golf match between Head Office and Salisbury House. It will be remembered that Mr. Gill and Mr. Cook, representing Head Office, won the first round against Mr. Lowe and Mr. Shackleton, while the second was won by the Salisbury House men. We hope that the inventory work will not prevent the final coming off before the end of the license.

THE Chess Club announce that the programmes for the coming season with regard to matches to be played has almost been completed. Ten matches have been arranged, and it is possible that two more may be added. New clubs entering the Civil Service and Municipal League are Westminster City Council and the Admiralty.

The opening night for the coming season will be Tuesday, Oct. 4, at "Ye Mecca," 140, Cheapside, E.C.

The club night throughout the season will be every Tuesday from 6 p.m. to 9.30 p.m.

A club handicap tournament will be held, the winner of which to receive a medal.

The secretary has not received any entries to date for the draught section, but no doubt these will follow when once the season starts.

### GLASGOW NOTES.

THE new building being erected by the Company in Hope Street, in which the Douglas Exchange will be housed, is nearing completion, and it is anticipated that the exchange will be in operation by April, 1911. The ceremony of placing a jar in the memorial stone was quietly performed on Wednesday, Sept. 7: the jar contains the business cards of the architects, builders and principal officers of the Company, together with a copy of a local newspaper, a copy of the JOURNAL, table of rates, etc., etc.

We have pleasure in recording that Mr. John D. C. Mackay, of the Glasgow office, who qualified in accountancy and law with honours in January, 1910, and was then admitted Associate of the Corporation of Accountants, Limited, has now been admitted Fellow of the London Association of Accountants, Limited.

FURTHER progress has been made in the unification of the Post Office and National systems. The Department's subscribers at Bearsden and Milngavie were successfully transferred to the respective Company's exchanges on Sept. 3 and 17, and at the time of writing it is expected that a similar transfer will be made to the Company's Clarkston Exchange on Sept. 24.

*Society.* The Telephone Society begins its session on Wednesday, Oct. 12, when a lecture will be delivered by Professor Magnus MacLean on "Kelvin: Investigations and Apparatus for Electric Signalling." During the session a lecture will be delivered on "Telegraphy," and the society is also to be favoured with a lecture by Professor Muir, Lecturer on Natural Philosophy at the Technical College. Opportunity is being provided for papers to be submitted under the conditions of the Head Office premium competition. The meetings will be held in the well-equipped lecture hall at the Technical College.

*Operators' Society.*—The arrangements for the coming session are well in hand and the first meeting will be held on Monday, Oct. 10. An interesting session is anticipated papers dealing principally with traffic matters will be read before the society and as hitherto the club will supply the social part of the programme.

THERE has been some excitement on the bowling greens for some little time, and the results of the clubs' competitions are now announced.

Championship prize, single handed (presented by Mr. Geo. Johnston), won by Mr. Wm. Stewart.

President's prize for pairs game, won by Messrs. Thos. Curr and F. Springer.

*Rink Competition. Prizes presented by the Club.*

First prize won by Messrs. W. Fursman, R. Brown, A. Blair and W. S. McKie (skip).

Second prize won by H. Sutherland, J. McMeeking, J. Kennedy and W. Wright (skip).

A successful season was brought to a close on Saturday, Sept. 17, when a match with Crosshill Victoria took place on Queens Park Green.

*Bell Golf Club.*—The August medal was played for on Aug. 20, when Mr. W. S. Stewart was returned the winner with the nett score of 87.

THE return golf match between teams representing Scotland, East and West, was played at Bathgate on Saturday, Sept. 10. The weather was not all that could have been desired but this had no deterrent effect. West was again victorious but by a diminished lead, the results being West seven games, East six games and one drawn game. The arrangements were in the capable hands of Mr. J. H. Allan of Edinburgh. Details are subjoined:—

East.		West.	
R. Allan, Edinburgh .. ..	0	J. Lowe, Greenock .. ..	1
J. H. Allan, Edinburgh .. ..	0	W. A. Valentine, Glasgow ..	1
A. Robson, Edinburgh .. ..	0	W. Lang, Glasgow .. ..	1
W. Knox, Edinburgh .. ..	0	W. Stewart, Glasgow .. ..	1
T. Elliott, Galashiels .. ..	0	J. A. Swanson, Greenock ..	1
R. Inglis, Kirkcaldy .. ..	1	A. Shearer, Glasgow .. ..	0
R. C. Wilson, Edinburgh .. ..	0	H. Thomson, Glasgow .. ..	1
H. V. Main, Edinburgh .. ..	1	D. B. Heberton, Glasgow ..	0
A. F. Dunn, Edinburgh .. ..	1	W. Allan, Glasgow .. ..	1
John Robert-on, Edinburgh ..	0	R. Brough, Glasgow .. ..	1
C. L. Stewart, Edinburgh .. ..	1	T. Smart, Greenock .. ..	0
R. Dobson, Hawick .. ..	1	J. F. Murray, Glasgow .. ..	0
C. McFarlane, Edinburgh .. ..	1	A. S. Duncan, Glasgow .. ..	0
R. B. Rae, Edinburgh .. ..	1	R. F. Kirkwood, Glasgow ..	0
	6		7

Many will regret to hear of the death of Mr. Archie Marshall who served the Company in Glasgow in the nineties, and was later employed in Birmingham. For some years he had been with the China & Japan Telephone Company, and was finally assistant manager at Singapore. He died on Wednesday, Aug. 31.

THIS is the elucidation of a mysterious "No reply." The calling subscriber, when questioned as to the call, could not remember anything about it, but when pressed further said in a rich Irish brogue:

"Sure, Miss, I'll tell you how it was. As a matter of fact I didn't ask for the number at all, but I—'s traveller was in the other day saying it was a long time since I had given him an order. I told him I had tried to get his firm on the 'phone on Saturday but the operator said there was no reply, so I gave my order elsewhere. I only told him that to put him off, because the leather he sent me last time was very bad, and I thought I would try someone else."

"Just tell your Boss that, Miss, and I'll take the blame if there is going to be any trouble."

IN common with the rest of the country, arrangements are now being made for the forthcoming session in connection with the Correspondence Classes and the Technical College Evening Classes, and while locally there is a small decrease in the entries for the former, there is a corresponding increase under the latter. An interesting point in this connection is the fact that over 200 operators have arranged to attend School Board Evening Classes for English and arithmetic. This represents a large proportion of the entire staff, and special classes have been arranged for them by the Glasgow and Govan School Boards.

AN unprecedented request has just been made by a large firm of warehousemen in the city. Two years ago their telephone service was brought up to date by the installation of a large private branch exchange and their experience of this has been eminently satisfactory. They now ask to be supplied with information as to the number of ineffective calls resulting from all their junction lines being engaged, so that they seem to realise the importance of the "open door." This is a point which is usually left to the Company to drive home.

### CORRESPONDENCE.

#### THE CORRESPONDING CLERK.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I HAVE read, with interest, A. H. Hudson's paper under the above heading, but I fail to see the necessity, as mentioned in the third paragraph, for the clerk to "go through" the files and extract those batches of papers bearing the current day's date, when by the use of Sch. No. 2092 and entries in a diary, all the clerk would have to do would be to refer to the diary each day for the "batch" numbers of the papers required that day, and then extract them from the filing cabinet, without wasting the time taken to "go through" the files.

Short particulars of the filing system in use at Manchester may be of interest.

#### Batch Number System of Filing Correspondence.

To commence this system the following requisites are necessary:—

- 1 double drawer card index cabinet.
- 1 large filing cabinet.
- 1 set of numerical cards.
- 1 set of alphabetical cards.
- 2 large letter baskets and
- A quantity of Shannon cases.

Shannon cases may also be used in place of the large filing cabinet, but the cabinet will be found to save a great deal of time.

*Numbering.*—No numbers are allotted to the letters when received, this being done when replied to, or, where no answer is necessary, before filing.

The system of numbering is, that each morning, each individual typist is given a numerical card similar to the enclosed (No. 1). After the letters are dictated, if no previous batch of papers is referred to, or handed to the typist,

she refers to the card cabinet to see if there has at any earlier date been correspondence on the same subject. If so, she gives her letter the same reference number; if not, she gives it a number taken from the numerical

## No. 1.

Dept.	No.	Name.	Subject.
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		

card given her in the morning (of course, no two numerical cards bear the same numbers) and fills in on the card the subject matter of the correspondence on the same line as such number on the numerical card. These cards are then handed back to the file clerk who cross-references same under as many headings as she thinks they are likely to be asked for. For instance, should you receive a letter from Messrs. Heenan & Froude re damaged cable in connection with the London County Council, this would appear on the following cards:—

We will assume the batch number is No. 5.

## Numerical Card.

1.	.....
2.	.....
3.	.....
4.	.....
5.	Heenan & Froude—Damaged cable—L.C.C.
6.	.....

## Alphabetical Cards.

	Card He.
5.	Heenan & Froude—Damaged cable—L.C.C.
	Card Da.
5.	Damaged cable—Heenan & Froude—L.C.C.
	Card Ca.
5.	Cable damaged—L.C.C.—Heenan & Froude.
	Card Lo.
5.	London County Co.—Damaged cable—Heenan & F.
	Card Co.
5.	County C. London—Damaged Cable—Heenan & F.

The above makes the finding of correspondence a very simple matter.

**Dead Matters.**—"Dead" letters (letters finished with) are filed away, in batch number order, in Shannon cases and can be readily turned up at any future date.

**Turning Up Letters.**—All that is necessary to turn up a batch of papers is to refer to the card index, obtain the number, turn to the cabinet and take out the batch bearing that number. From this you will see it is not necessary for the clerks to trouble the file clerk to find their papers; each can find their own, but the file clerk must watch that no one takes a batch away without leaving his or her signature, which is entered on a card and placed in number order in the cabinet, this card being taken out and destroyed when the papers are returned.

**Diary Notes.**—To prevent matters being delayed, or to ensure that certain matters are cleared up, or dealt with on dates required, each clerk is furnished with a batch of diary slips (Sch. 2092), one of which he places at the head of papers so required, the file clerk entering the batch numbers against the respective dates in the diary.

**General.**—Each evening all batches of papers, both pending and dead, are brought to the correspondence room where two large letter baskets are kept, one marked "pending matters" and the other "dead matters." Each clerk when bringing in his or her papers must sort same into their respective baskets, drawing a blue line right across the top letter of any batch that is "dead" and initialling same, together with date. The following morning the file clerk goes through the "pending" basket, enters all diary notes and files away in filing cabinet, then turns to the "dead" basket and files away all "dead" matters in Shannon cases.

This method in theory may sound complicated, and one that takes up a great deal of time, but when once got fairly going is very simple, and in comparison to most methods very quick.

Of course all outward letters bear batch (or reference) number, and in the great majority of instances it will be found that the person replying will quote such number.

Manchester, Sept. 5.

MARY DUFFY,  
Chief Correspondence Clerk.

## RECORDS OF CALLS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

No doubt most recording clerks have had to put up with some very forcible remarks and threats from divers subscribers with regard to the recording of calls, and it is quite refreshing to have a subscriber admit that the calls recorded are correct. The following occurred recently at the Hull district office:—

A lady called in one day and in a most violent manner denounced the Company and its method of registering calls. I, however, used my most persuasive powers and eventually obtained the necessary deposit. Some months later she called in again to pay a further deposit, and, noticing a great difference in her manner, I ventured to ask if the record of calls was now satisfactory. Imagine my surprise on receiving the following reply:—"Oh yes, I have found out where the trouble was. My youngest son has a tricycle at home and in order to 'exercise it,' he gets up between five and six in the morning; not satisfied with this, he must have three or four friends with him, consequently, the telephone being handy, it was used to summon the said friends."

It appears the good lady had asked her elder children if they used the telephone and they denied doing so. It was not until one of her lady friends asked her to stop the boy from ringing up so early in a morning that the mystery was solved, as after getting out of bed and going to the telephone, she was invariably greeted with the query, "Is Reggie coming out?"

We have found out housemaids, servants, clerks, etc., using instruments without permission, but fancy a poor little toy tricycle being the cause of all the bother!

Hull, Sept. 19.

H. B. PEGDEN.

## A TELEPHONE PHRASE BOOK.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

TELEPHONY and phonography, like youth and love, go hand in hand. With the aid of the "winged art" innumerable telephonic communications are committed to paper.

It is certain that a large number of the Company's staff, and particularly the clerical staff, are phonographers.

Sir Isaac Pitman & Sons, whose system of shorthand I use, have long ago issued hand-books wherein their system is adapted to various businesses, etc.; for instance, they publish the "Banking Phrase Book," "Insurance Phrase Book," "Legal Phrase Book," and others.

In these are given—both in longhand and shorthand—elaborate lists of frequently used phrases which are peculiar to the respective trades, etc., with which they deal.

There are almost innumerable phrases in everyday use exclusively applying to our business—namely, that of telephony—and on my suggestion Sir Isaac Pitman & Sons have expressed their willingness to publish a book to be entitled "The Telephonic Phrase Book" (or, possibly, the "Telephonic and Telegraphic Phrase Book.")

The value of such a book will, I believe, be readily appreciated, more especially by those of my colleagues, who are, like myself, keen phonographers.

If you can kindly find space for this letter in the JOURNAL I shall be grateful, and I invite suggestions, either through the JOURNAL or by post to me direct, from any of your readers who are sufficiently interested.

District Office, Dover, Sept. 15.

EDGAR W. WILSON.

## THE TELEPHONE LOAD LINE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the point raised by Mr. Sansome in the September number of the JOURNAL regarding the relation between the number of outgoing junctions at an exchange and the average "junction valuation" of calls, I have the following observations to make:—

1. Table C (July number) represents the average "junction valuation," and this refers to all classes of junction calls.

2. In London we have a complicated junction system involving six junction centres and 84 other exchanges. As an exchange grows in size, so it requires more junctions, and this implies: (a) Gradual transfer from signal to order wire working; (b) more direct junction communication. A junction call thus becomes easier and easier to operate until the exchange is of a certain size.

3. In the illustration given by Mr. Sansome, although the junctions are increased, the facility for completing junction connections is not increased, and consequently there is no reason why the value of a junction call should fall.

4. Table C, as stated in the June number, is used with reserve in London.  
London, Sept. 20.

H. DEANE, Assistant Traffic Manager.

## EXAMINATION SUCCESSES.

**Belfast**—Board of Education, South Kensington: W. S. Keown, second class certificate, practical mathematics, stage 2. H. Jervis, second class certificate, magnetism and electricity, stage 1. R. Connor, second class certificate, magnetism and electricity, stage 1. W. J. Currie, first class certificate, practical mathematics, stage 1, and second class certificate, magnetism and electricity, stage 1. G. Anderson, second class certificate, practical mathematics, stage 2. R. Woods, second class certificate, practical mathematics, stage 1.

**Burnley**—Tom Hargreaves, City and Guilds of London, electrical eng., pass; Board of Education, mathematics, stage 2, second class certificate. H. Adams, Board of Education, pure mathematics, stage 2, second class certificate; City and Guilds of London, ordinary telephony, second class certificate; T. G. Turley, City and Guilds of London, ordinary telephony, second class certificate. J. H. Taylor, Board of Education, magnetism and electricity, stage 2, second class certificate; theoretical mechanics (fluids), stage 1, second class certificate; theoretical mechanics (solids), stage 1, second class certificate. A. Hargreaves, Board of Education, pure mathematics,

stage 1, second class certificate. E. F. Catton, City and Guilds of London, ordinary telephony, second class certificate.

**Engineer-in-Chief's Staff.**—The following successes have been gained by members of the Engineer-in-Chief's staff in the examinations recently held by the City and Guilds Institute: Telephony: F. W. Friday, first class (honours) and silver medal; E. Strong, first class (honours); J. R. Hembrough, second class (honours); W. Hicks, second class (honours); E. Foulger, second class (ordinary); A. R. Fraser, second class (ordinary); R. S. Rowe, second class (ordinary). Telegraphy: J. W. Wheeler, first class (ordinary).

The following have passed the examinations instituted by the Board of Education:—W. Hicks, practical mathematics; R. S. Rowe, practical mathematics.

## INVENTORY OF PLANT.

THE work of taking the inventory of the Company's plant will commence on Oct. 3, the centres which will be taken first being Bristol, Plymouth, Reading, Huddersfield, Halifax, and Wolverhampton. The following list shows those who have been detailed to undertake this work. Some of them are already on the Engineering staff and the others have been temporarily added to it for the purpose:

In charge .. .. . A. WATTS.

### HEADQUARTERS STAFF.

R. Aitken, )  
W. J. Gray, ) Engineer-in-Chief's Staff.  
G. M. Maddock, )  
R. Bryson, Chief Clerk, Metropolitan.  
A. M. Watt, Secretary's Audit Staff.  
F. Street, )  
C. F. Blake Brown, ) Engineer-in-Chief's Staff.  
C. Hughes, )  
J. McClintock, Draughtsman, Greenock.  
R. B. Rae, Engineer's Clerk, Edinburgh.  
P. R. Cockrem, Cost Clerk, Nottingham.

### TRAVELLING STAFF.

**Divisional Officers.**—  
Fulton, D. B. .. .. Engineer .. .. E.-in-C. Staff, H. O.  
Gilbert, A. B. .. .. Engineer .. .. Glasgow.  
Roberts, A. .. .. Electrician .. .. Liverpool.  
Shackleton, J. M. .. .. Engineer .. .. Metropolitan.  
Taylor, W. F. .. .. Contract Manager .. .. Metropolitan.  
Terras, J. S. .. .. Engineer .. .. Birmingham.  
Waite, B. .. .. District Manager .. .. Cardiff.  
Wolstenholme, C. W. .. .. Engineer .. .. Liverpool.

### Sectional Officers—

Barr, F. .. .. Local Manager .. .. Sheffield.  
Brown, F. G. .. .. Local Engineer .. .. Metropolitan.  
Byng, E. S. .. .. Asst. Engineer .. .. Metropolitan.  
Cleary, W. .. .. Asst. Engineer .. .. Manchester.  
Drabwell, C. E. .. .. Clerk .. .. Metropolitan.  
Dixon, J. T. .. .. Cost Clerk .. .. Liverpool.  
Dring, G. .. .. Local Manager .. .. Worcester.  
Escott, H. .. .. Exch. Electrician .. .. Manchester.  
Frost, J. .. .. Engineer .. .. Blackburn.  
Harper, T. .. .. Local Manager .. .. Bournemouth.  
Hibberd, F. W. .. .. Chief Clerk .. .. Met. Engineers.  
Hives, F. G. .. .. Local Manager .. .. Reading.  
Hunt, R. W. .. .. Div. Engineer .. .. L'pool.  
Jackson, R. W. .. .. Engineer .. .. Newcastle.  
Jarratt, E. G. .. .. Local Manager .. .. Wolverhampton.  
Jones, J. E. .. .. Electrician .. .. Bristol.  
Kidd, A. M. .. .. District Manager .. .. Cork.  
Lewis, T. .. .. Local Engineer .. .. Metropolitan.  
Parry, J. .. .. Exchange Manager .. .. Liverpool.  
Pettigrew, T. .. .. Asst. Electrician .. .. Glasgow.  
Price L. .. .. Engineer .. .. H. O.  
Redhead, C. H. .. .. Engineer .. .. Dublin.  
Roberts, F. W. .. .. Local Manager .. .. Brighton.  
Scutt, W. D. .. .. Electrician .. .. Leeds.  
Squire, F. W. .. .. Chief Clerk .. .. Exeter.  
Storrie, J. H. .. .. District Manager .. .. Kirkcaldy.  
Tattersall, J. T. .. .. Engineer .. .. Hull.  
Tucker, R. V. .. .. Chief Clerk .. .. Birmingham.  
Weatherburn, S. W. .. .. Local Manager .. .. Kendal.  
Weston, C. S. .. .. Chief Clerk .. .. Guildford.

### Clerks

Airey, J. (Cost Clerk, Blackburn). Cooper, E. B. (Supt.'s Office, Birmingham). Clutterbuck, F. W. A. (Ex. Man. in training, Bristol). Dunkerley, H. (Clerk, Oldham). Edgar, J. F. (Contract Officer, Nottingham). Fraser, E. J. (Stores Clerk, Edinburgh). Gould, W. W. (Clerk, Wolverhampton). Gilchrist, R. F. (Cost Clerk, Glasgow). Hood, J. (Chief Clerk, Stirling). Holdsworth, F. (Clerk, Bradford). Moulton, H. R. (Clerk, Metropolitan Accts.). Moore, W. E. (Stores Clerk, Brighton). Pratt, W. J. (Cost Clerk, Norwich). Purcell, J. (Stores Clerk, Dublin). Preston, O. (Clerk, Newcastle). Simpson, A. E. (Clerk, Bradford). Smart, E. W. (Electricians Clerk, Cardiff). Surplice, R. (Supt.'s Clerk, Dublin). Welsh, R. (Stores Clerk, M'ter). Wilson, J. (Clerk, Bolton). Wright, W. R. (Clerk, Metropolitan Accts.).

### Draughtsmen—

Adams, C. (Draughtsman, Belfast). Allport, A. W. (Draughtsman, B'ham). Bathgate, J. H. (Draughtsman, Manchester). Batho, G. (Draughtsman, Liverpool). Bennett, S. Y. (Sub-Engineer, Bath). Donnellan, — (Draughtsman, Wolverhampton). Hallam, A. (Draughtsman, Manchester). Halliday, E. I. (Draughtsman, Liverpool). Hardy, A. H. (Draughtsman, Southampton). Heggie, J. W. (Draughtsman, Glasgow). Hill, J. N. (Draughtsman, Met. Engineers). Hunt, L. W. (Chief Inspector and Draughtsman, Ipswich). McNab, A. (Draughtsman, Edinburgh). Millett, H. G. (Eng., Electrical and Clerical, Bristol). Thorpe, W. R. (Draughtsman, Met. Engineers). Towers, R. (Draughtsman, Liverpool).

### Enumerators—

Armstrong, E. (Local Mgr., Hastings). Audsley, R. (Local Mgr., Paisley). Anderson, S. C. (Foreman, M'chester). Batchelor, G. (Asst. Engineer, Southampton). Bailey, W. (Sub-Engineer, Birmingham). Barnes, T. M. (Foreman, Wolverhampton). Bell, R. W. (Local Mgr., Rochdale). Beattie, W. (Local Mgr., Wigan). Bennett, S. Y. (Sub-Engineer, Bath). Baillies, D. C. (Inspector, Glasgow). Bewick, G. E. (H. O. Switchboard Staff). Bruce, R. (Asst. Engineer, Belfast). Bufton, C. W. (Local Manager, Canterbury). Cleary, J. (Asst. Engr., Stockport). Castleton, W. (Local Mgr., Scarborough). Carey, P. (Linesman Insp., Cork). Coles, W. H. H. (Linesman Insp., Chippenham). Cunningham, T. (Foreman, Liverpool). Denham, P. R. (Acting Draughtsman, Portsmouth). Devon, J. C. (Foreman, Liverpool). Dipple, W. H. (Eng. Inspector, B'ham). Dolman, R. (Inspector, Birmingham). Donaldson, J. (Eng. Inspector, Glasgow). Elsom, J. (Foreman, Metropolitan). Findlay, R. (Foreman, Metropolitan). Fisher, W. (Foreman, Newcastle). French, C. M. (Local Mgr., Stroud). J. Frost (Sub-Engineer, Hanley). Gaskins, F. W. (Asst. Engr., Newcastle). Gallard, G. H. (Asst. Engineer, Metropolitan). Graham, J. (Asst. Electrician, Edinburgh). Graham, R. S. (Sub-Engineer, Glasgow). Graham, D. (Switchboard Fitter, Glasgow). Gregory, E. (Local Manager, Durham). Greenwood, T. E. (Inspector-in-Charge, Beverley). Ginn, H. G. (Sub-Engineer, Cardiff). Greaves, J. E. (Local Manager, Burton). Gray, G. (Test Clerk, Birmingham). Hobson, J. W. (Engineer, Dundee). Hall, C. W. (Asst. Engineer, Newcastle). Hague, E. L. (Asst. Engineer, Cardiff). Hopps, F. (Sub-Engineer, Nottingham). Hilton, W. B. (Instrument Insp., Darwen). Hutchinson, D. (Asst. Engineer, Metropolitan). Hunt, G. (Foreman Faultsman, Dublin). Kenworthy, H. M. (Asst. Electrician, Dublin). Kennedy, J. (Foreman, Glasgow). Kitchman, S. (Asst. Engineer, Belfast). Lewin, P. (Chief Inspector, Norwich). Lyon, H. (Walking Foreman, Metropolitan). Lucas, H. (Foreman, Metropolitan). Macnamara, W. H. (Chief Insp., Bristol). McDowell, J. (Foreman, Belfast). McCann, J. E. (H. O. Switchboard Staff). McLean, M. (Sub-Engineer, Glasgow). McDowell, A. (Asst. Engineer, Belfast). McKenzie, R. (Engineer, Stirling). McMeeking, J. W. (Asst. Engineer, Glasgow). McPhail, W. (Asst. Engineer, Paisley). Moon, F. (Asst. Engineer, Burnley). Morgan, A. H. T. (Sub-Engr., Torquay). Morris, L. C. (Insp.-in-Charge, Rhyll). Millett, H. J. (Elec. Engineering and Clerical, Gloucester). Mushens, A. (Local Mgr., West Hartlepool). Nicols, H. (Local Manager, Chatham). Paynter, A. Paynter, J. (Foreman, Manchester). Pagan, D. (Sub-Engineer, Edinburgh). Pearson, R. S. (Engineer, Leicester). Powell, W. H. (Asst. Engineer, Birmingham). Padgett, W. (Electrician, Portsmouth). Podmore, A. (Sub-Engineer, Sheffield). Pipe, S. E. (Chief Inspector, Middlesbro'). Radford, J. (Electrician, Swansea). Rhodes, T. C. (Local Mgr., Bedford). Roberts, F. H. (Exch. Inspector, Nottingham). Rogers, W. J. (Wayleave Officer, Luton). Richardson, T. (Local Manager, Elgin). Romain, W. (Asst. Engineer, Metropolitan). Riley, O. (Walking Foreman, Metropolitan). Satchwell, W. A. (Exch. Inspector, Manchester). Sim, W. (Engineer, Exeter). Smith, H. T. (Local Manager, Lincoln). Spargo, A. (Local Mgr., Stockport). Stevens, F. (Asst. Engineer, Swansea). Stallard, E. G. (Foreman, Bristol). Sullivan, W. A. (Exchange Inspector, Metropolitan). Suggitt, R. (Asst. Engineer, Bradford). Swift, F. (Instrument Insp., Bradford). Starkey, H. Y. (Asst. Engineer, Luton). Tate, G. (Chief Inspector, Newcastle). Thorpe, L. (Foreman, Metropolitan). Talbot, G. N. (Asst. Engr., Metropolitan). Thomas, R. (Foreman, Liverpool). Turner, C. H. (Foreman, Birmingham). Tite, W. (Exchange Inspector, Metropolitan). Usherwood, G. E. (Foreman, Blackpool). Wallace, G. (Sub-Engineer, Dublin). Whittle, J. G. and Williams, C. (Divisional Maintenance Electricians, Liverpool). Wran, A. R. (Engineer, Plymouth).

### Special Work—

Blight, W. (Div. Maint. Elect., Metropolitan). Bryant, G. H. (Electrician, Metropolitan). Head, F. G. (Sub-Engineer, Bristol). Johnson, R. P. (Sub-Engineer, Birmingham). Morgan, E. C. (Local Manager, Weston-super-Mare). Peck, H. S. (Ex. Electrician, Metropolitan). Phillips, C. H. (Asst. Engineer, Metropolitan).

## MID-YORKS BENEVOLENT SOCIETY.

Receipts and Expenditure for year ending Aug. 31, 1910.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Members' subscriptions ..	20	11	10	By Grants made to members of society ..	13	15	0
„ Company's subscriptions (2 7s. 4d., £19 4s. 8d.) ..	21	12	0	„ Sundries ..	0	0	10
„ Amount due from Company as per August subscriptions—see contra ..	1	7	2	„ Amount due from Company—as per contra ..	1	7	2
„ Balance brought forward from Aug. 31, 1909 ..	37	7	5	„ Amount in treasurer's hands ..	1	10	2
„ Bank interest, Dec. 31, 1909 ..	0	16	9	„ Cash as per bank book ..	65	2	0
	£81	15	2		£81	15	2

W. V. Morten, chairman. T. A. Crowther, secretary. W. R. Senior, treasurer.



## NEWS OF THE STAFF.

Mr. C. H. DAVIDSON has been transferred to the position of Chief Inspector, Cambridge, from a similar position at Great Yarmouth. Before leaving Yarmouth he was the recipient of an umbrella and music from the local staff as evidencing their appreciation and good wishes.

Mr. T. W. CAPENHURST, Local Manager, Lowestoft, has been transferred to a similar position at Londonderry. He has been for several years in the East Coast district and, prior to his leaving, was presented with a set of ebony-backed brushes as a token of the good wishes of his staff.

Mr. L. F. MORICE, Assistant Engineer, Bristol, has been promoted to be Engineer for the Portsmouth area. On the occasion of his leaving Bristol he was presented by the Engineer, on behalf of the staff, with a kit bag. In making the presentation Mr. Preston voiced the feelings of the staff when he expressed regret that Mr. Morice was leaving Bristol, and also when he wished him every success in his new appointment, and added that he no doubt had secured this by always being eager to gain knowledge which had made him efficient.

Miss BESSIE MADELINE FRICKER, of Dover, has been appointed Travelling Supervisor for the East Kent (Dover) district.

Mr. H. J. CORKE, who had been Local Manager at Folkestone for sixteen years, was the recipient of a handsome marble clock, suitably inscribed, from the East Kent district staff on the occasion of his transfer as Local Manager to Ashton-under-Lyne.

Miss GERTRUDE GRINDROD, Operator, Keighley, resigned on Sept. 8 after ten years' service, to go to Canada. She was presented with a mother-of-pearl blouse watch by the Keighley staff, as a token of the esteem and regard in which she was held by them.

Miss JESSIE SHACKLETON, Operator, Keighley, who recently left the Company's service to become the Private Branch Exchange Operator for the Stockbridge Finishing Company, was presented with a silver-backed mirror by the staff.

Miss GRACE FORRENT, Operator, Royal Exchange, Glasgow, has been promoted to be Supervisor, Belfast. She received a pendant and chain from the staff in her exchange.

Miss AGNES BLACK, Operator-in-Charge, Pollokshaw's Exchange, Glasgow, left on May 26, to be Operator in G. & J. Weir's private branch exchange. She was the recipient of several personal presents from the staff in her exchange.

Miss MARGARET FIFE, Operator, Royal Exchange, Glasgow, has been promoted to be Supervisor in the Argyle Exchange.

Miss JEANIE BRIDGES, Operator-in-Charge, Bearsden Exchange, Glasgow, left on Sept. 15 to go to South Africa. She was presented with a silver manicure set and silver thimble by the staff in her exchange.

Miss ANNIE THOMSON, Senior Supervisor, Royal Exchange, Glasgow, has been transferred to Hillhead Exchange, Glasgow, in the same capacity.

Miss JANE SKELLY, Supervisor, Royal Exchange, Glasgow, has been promoted to be Senior Supervisor in the same exchange.

Miss ROSETTA ISAACS, Supervisor, Hillhead Exchange, Glasgow, has been transferred to Royal Exchange, Glasgow, as Supervisor.

Miss JESSIE CLARK, Supervisor, Argyle Exchange, Glasgow, has been promoted to be Chief Operator, South Exchange.

Miss ELSIE WATERWORTH, Operator, City Exchange, Manchester, left the Company's service on Aug. 4, and on leaving was presented by the City Exchange operating staff with a gold bangle.

Miss HILDA GRACE THOMAS, Operator, Newport, Mon., resigned on Sept. 1, after two years' service, to take up another appointment. She was presented by her colleagues with a gold brooch as a token of esteem and remembrance.

Miss MARION OVERTON has been promoted from Supervisor to Monitor, Leeds Central Exchange.

Miss CONSTANCE E. HILL has been promoted from Supervisor to Monitor, Leeds Central Exchange.

Miss LILIAN CHIPPENDALE has been promoted from Operator to Supervisor, Leeds Central Exchange.

Miss ALICE A. DANIELS has been promoted from Operator to Supervisor, Leeds Central Exchange.

Miss NELLIE N. MYERS, Chapeltown Exchange, has been promoted from Senior Operator-in-Charge to be Supervisor at the Leeds Central Exchange.

Miss MARY A. HOWES, Operator, Leeds, has been promoted to be Senior Operator-in-Charge at Chapeltown.

Mr. E. A. ELLETT, Contract Officer, Isle of Wight centre, on his transfer to the London district, was presented by the District Manager, on behalf of the staff, with a handsome marble dining room clock, with an escutcheon suitably engraved, as a token of their regard.

Mr. G. TATE, Contract Officer, Hastings, has been transferred to Gravesend. Mr. T. GIRDLER, Contract Officer, Hastings, has been transferred to Glasgow.

Mr. J. G. GROVER, Contract Officer, Brighton, has been transferred to Eastbourne.

Mr. H. H. CLARKE, Contract Officer, Brighton, has been transferred to Hastings.

Mr. A. E. EVERSHED, Contract Officer, Eastbourne, has been transferred to Manchester.

Mr. A. N. WILKINS, Contract Officer, Brighton, has been transferred to Dorking.

Mr. A. BRACKLEY, Inspector, Brighton, has been transferred to Eastbourne.

Mr. W. BRICKETT, Inspector, Brighton, has been transferred to Hastings.

Mr. W. GUNN, Inspector, Brighton, has been transferred to Eastbourne.

Mr. H. MALLETT, Inspector, Hastings, has been transferred to Brighton.

Mr. J. GAMBIER, Fitter, Brighton, has been transferred to Bournemouth.

Mr. D. GUNN, Wayleave Officer, Brighton, has been transferred to Folkestone.

Mr. A. BOYLE, Instrument Inspector, Limerick, resigned his position in the Company's service on Aug. 27, on which date the staff presented him with a dressing case. Mr. Boyle is about to sail for Sydney, New South Wales, and the staff wish him every success.

Mr. ALAN F. HOLT, Correspondence Clerk, Blackburn, left the service on Sept. 3 to take up a position in the Government Telephone Department, Winnipeg. He was presented with a travelling rug and safety razor by the district staff.

Mr. J. W. PARRY, Contract Officer, Warrington, has been transferred as a Contract Officer at Manchester, and was presented by the members of the Warrington staff with a silver-mounted umbrella.

## METROPOLITAN STAFF CHANGES.

Mr. N. LAYTON, Inspector, North, has been transferred as Inspector to Hampstead.

Mr. T. S. WILLARD, Clerk, Statistical Office, has been appointed Senior Clerk, Correspondence Department.

Mr. R. F. GILL, Inspector, Holborn, has been appointed Test Clerk, North.

Mr. C. W. TREACHER, Chief Inspector, Paddington, has been transferred as Chief Inspector to Gerrard Street.

## Traffic Department.

Miss FLORENCE DINGLE, Supervisor, London Wall, promoted to be Senior Supervisor, Paddington.

Miss EDITH JONES, Operator, Hop, to be Supervisor, London Wall.

Miss VERA RIN, Supervisor, Gerrard, to be Supervisor, Operating School.

Miss FLORENCE EAST, Operator, Paddington, to be Supervisor, Gerrard.

Miss MARGARET CLEMENTS, Operator, Bank, to be Supervisor, Avenue.

Miss ANNIE KINSEY, Supervisor, Hop, to be Supervisor, Battersea.

Miss FRANCES SMITH, Operator, Woolwich, to be Supervisor-in-Charge, Dartford.

Miss MAY DE CHASTELAIN, Operator, Kensington, to be Supervisor, Hammersmith.

Miss MAUD HOGGINS, Operator, Redhill, to be Supervisor-in-Charge, Reigate.

On Miss ANNIE LIDDELL'S promotion from the Operating School to be Senior Supervisor at New Cross she was presented by her late colleagues with four volumes of Ruskin's works.

On Miss EDITH TRINGHAM'S promotion from the School to Hammersmith she was presented with Mrs. Browning's poems.

Miss FLORENCE HARE, Operator, on her transfer to Richmond in a similar capacity, was presented with a gold brooch.

Miss OLIVE HART, Operator, Bromley, on her transfer to London Wall, was presented with a gold bracelet by her late colleagues.

Miss NELLIE SMITH, similarly transferred to London Wall, was presented with a writing desk.

Miss HELEN COLE, Operator, Holborn Exchange, was presented with a hand-painted mirror, a fire screen and a flower basket by the staff, and with a fruit stand, rose bowl and an art pot by personal friends.

Miss CHARLOTTE JEFFERIES, Supervisor, on leaving Avenue, was presented with a cream and sugar stand by the staff.

## MARRIAGES.

Miss ELIZABETH M. ELLIS, Operator, Gillingham, left the Company's service on Aug. 4 to be married to Mr. J. B. ROUSE, Storekeeper at Chatham.

Mr. ROUSE, in view of his approaching marriage, was the recipient of a brass curb and fire irons from the staff of Chatham centre. The presentation was made by the Local Manager, Mr. J. C. Nichols, who expressed the good wishes of the staff.

Miss EDITH CORRIN, Operator, Douglas, who has been in the service since October, 1903, is leaving to be married. She was presented with a silver cake dish, cream jug, and sugar basin by the staff.

Miss E. HAMILTON, Operator, Warrington, who joined the Company's service Nov. 1, 1895, upon resigning to be married was presented by the combined Warrington staff with a Sheraton eight-day striking clock.

Miss ELIZABETH GORMAN, Operator-in-Charge, Maryhill Exchange, Glasgow, left on Sept. 1 to be married. She was presented with a silver lustre teapot and hot water jug by the staff in her exchange.

Miss CATHERINE MACCONNOCHIE, Chief Operator, South Exchange, Glasgow, who left the Company's service on Sept. 1 to go to Nova Scotia to be married, was presented with a case of cutlery by the staff in her exchange. Miss MacConnochie was also presented with a silver-mounted crystal salad bowl by a few of the chiefs and senior officers of the Traffic Department, which they asked her to accept with their sincere wishes for her future happiness.

Miss CHRISTINA O'REGAN, Senior Operator, Cork, was, on the occasion of her recent marriage, presented with a dinner service subscribed for by the staff in the South of Ireland district.

Mr. A. E. SUTHERLAND, Head Office, Engineers Department, Nottingham Factory, was the recipient of an oak bookcase bureau on the occasion of his marriage, Mr. J. W. Briggs making the presentation on behalf of the Engineers' and the Factory staff combined.

Mr. E. JACKSON-SMITH, of the Engineer-in-Chief's Department, Nottingham Factory, was the recipient of a Gladstone bag, silver cruet and case of razors, from the combined Engineers' and Factory Managers' staffs on the occasion of his wedding.

Mr. G. HAMER, Contract Officer, was presented with a dinner service by the staff in view of his approaching marriage. The presentation was made by the Local Manager (Mr. F. Barr).

## London Traffic Department.

Miss MABEL THAIN, Operator, Gerrard, on leaving to be married, was presented with a plated toast rack and a flower centre.

Miss HENRIETTA PEREIRA, Supervisor, Gerrard, who left to be married, was presented with a dinner service by the staff, the operators in her division also presenting her with a cruet.

Miss ETHEL GORDON, Operator, Battersea, on leaving to be married was presented with a tea service, trinket set and pickle jar.

Miss PHYLLIS CRAWLEY, who has resigned for a similar reason from the same exchange, also received a tea service and a pickle jar.

Miss ALICE COLLIP, Operator-in-Charge, Reigate, who has resigned on account of her approaching marriage, was presented by the Redhill staff and colleagues in the Croydon district with a silver-mounted oak biscuit barrel.

Miss MARGARET BROOMHAM, Operator, Enfield, on leaving the service to be married was presented with a silver cake basket by the exchange staff (Operating and Maintenance) and a few friends in the North district.

Miss JESSIE COOPER on leaving Bromley for London Wall and in view of her pending resignation to be married, was presented with an *epagne* and art pots by the Bromley Engineer, Maintenance and Traffic staffs.

Miss NELLIE HOTCHKISS, Operator, Avenue, was presented with a fire screen on leaving the service to be married.

Miss MARY LONGHURST, Operator, London Wall, on resigning to be married, was presented by the staff with a tea service, set of table glass, hot water jug and coffee pot and stand. Miss Longhurst, who had for some time acted as caterer with marked success, also received a large number of gifts from personal friends among the staff.

Miss LOUISA HAYNES, Operator, on leaving Hammersmith to be married, was presented with a tea service and a cut glass celery vase.

Miss FLORENCE DREW, Supervisor, Holborn, on leaving the service to be married, was presented by the staff with a tea service. Miss Drew was also the recipient of a fruit stand and several useful articles from her colleagues on the supervising staff.

#### OBITUARY.

It is with sincere regret that we have to chronicle the death of one of the oldest members in the Company's service, Mr. ARTHUR TILL WALLER, which occurred on Friday, Sept. 16. Mr. Waller had been seriously ill since March last, but recent reports were so favourable that we had hoped soon to have him with us again. The sad end came very suddenly from the bursting of a blood vessel in the brain.

Mr. Waller entered the service of the Bell Telephone Company as a junior clerk, at the offices in Coleman Street, on Oct. 21, 1879. He was appointed stationery clerk in 1883, and afterwards held positions in the cashier's office at Oxford Court and at the Metropolitan offices, when the latter were separated from Head Office. From 1896 to 1904 he was Cashier of the Western district, and from 1905 to 1910 he was Cashier at Salisbury House.

Mr. Waller was always to the fore in any works for the benefit of the staff. He did splendid work as hon. secretary of the National Telephone Staff Benevolent Society, and it is not too much to say that he had a great deal to do with the actual formation of the society. He was on the committee of the National Provident Club and on the local committee of the Staff Transfer Association. The introduction of the instalment system for season tickets which is now so largely taken advantage of by the staff was due, in the first instance, to Mr. Waller. In fact there has been no work for the benefit of the staff or work of charity in which Mr. Waller did not interest himself.

His loss will be long felt by the staff by whom he was regarded with affection and respect.

His portrait appeared in the November, 1909, number of the JOURNAL on the occasion of his completing 30 years service with the Company.

We regret to announce the death of Mr. FREDERICK THOMAS RUSHTON, a member of the staff of the Company's Solicitor, who died suddenly in August last.

Mr. Rushton was admitted a solicitor in 1873, and for some time practised on his own account at New Inn, London. He joined the Company's service about five years ago, and has been engaged chiefly in connection with the Conveyancing Department.

Mr. Rushton was of a quiet and retiring disposition, invariably courteous to all with whom he had business relations, and extremely popular with his colleagues, who very sincerely regret his loss.

We have to record the death of JONTER C. MASON which took place very suddenly at West Bromwich about midday on Sept. 5. He complained of feeling unwell on that day, and went into the exchange, where he remained some time. On stating that he felt better, he started to go home but collapsed before he could get to the tram terminus and died almost immediately. An inquest was held at which the jury returned a verdict of "Death from natural causes."

He joined the Company's service in September, 1897, as a labourer and was a good, steady, reliable workman.

We regret also to record that Foreman GEORGE NICOL met with a fatal accident at Banchory, Kincardineshire, on Sept. 15. Deceased had occasion to go on to the roof of an engine house when his foot slipped and he fell through a glass roof light on to the engine in motion, sustaining such injuries that death must have been instantaneous. The deceased, who had been in the Company's service for the long period of 26 years, was held in the highest esteem by all who knew him. Out of respect to his memory the staff placed two wreaths on his grave, and all in the centre mourn the loss of an honourable workman.

Miss FLORENCE RICHER, late Supervisor, Avenue, the presentation to whom was recorded in last month's JOURNAL, was erroneously described as leaving to be married. Her name should have been included in "News of the Staff" as resigning merely.

#### STAFF GATHERINGS AND SPORTS.

**Brighton.**—On Sept. 10 a party of the Company's Brighton staff held the second half-day outing of the season, the rendezvous being the "Shepherd and Dog," Fulking. Sixty-two sat down to tea. Mr. C. Moorhouse (who was accompanied by Mrs. Moorhouse), District Manager, presided, and there were also present Mr. F. W. Roberts (Local Manager) and Mrs. Roberts, Mr. L. Parsons (Chief Clerk) and Mrs. Parsons, Mr. D. Wallace (Contract Manager), Mr. H. Hutton (Electrician), Mr. G. Dowman (Engineer), Miss Trott (Clerk-in-Charge, Brighton Exchange), Mr. T. Rogers (Head Office audit staff), Mr. H. J. Maclure (Contract Manager, Birmingham), and other principal officers. After tea the opportunity was taken to present Mr. F. W. Roberts with a handsome gold hunter watch, subscribed for by the Sussex staff, as a memento of his 25 years' service with the Company. All grades took part in the subscription, including the local Directors. Mr. Moorhouse made the presentation in a few well-chosen words, and Mr. Roberts feelingly responded, giving a short *resumé* of events during his seven years in Brighton, which he is about to leave, having been appointed to a position on the Inventory staff.

**Leeds.**—*Chambers Challenge Cup.*—Mid-Yorks district won the final tie against East Yorks, on Aug. 27, at the Grammar School Ground, Bridlington. Although East went in first, and made 110, Mid-Yorks were able in a failing light to beat them by seven wickets, Keighley making 80 not out.

**Coventry.**—At a well-attended meeting of the staff, held at Priory Row Assembly Rooms on Sept. 8 with Mr. J. Mewburn, District Manager, in the chair, Mr. John Scott, Assistant Provincial Superintendent, gave an excellent and well-thought out address upon the present and future prospects of the staff, at the same time giving a report as to what work the Staff Transfer Association has done and is doing in the interests of all sections of the staff. At the close of the address several questions were asked the speaker, who briefly replied to the various points raised. During the evening Mr. Scott presented certificates to the successful students in last year's telephony classes.

**Edinburgh.**—The staff at Edinburgh held the last of the summer rambles on Sept. 3. Having taken train to Loanhead, the party of 65 walked to Roslin, where tea was taken. A beautiful afternoon favoured the excursion and the interesting walk was much enjoyed.

**Amphère Golf Club.**—Mr. R. Gilmour, District Manager, has very kindly presented to the club a very handsome shield to be played for annually, and the first competition for it, held over the Musselburgh course on Sept. 3, drew out a large number of the members. Mr. H. V. Main won the custody of the shield and first prize; Mr. C. L. Stewart, second; Mr. R. Allan, third; Mr. D. Matheson, fourth.

**Portsmouth.**—On Aug. 27 the operators and friends in the Isle of Wight and a few operators from Portsmouth Exchange met at Ryde and proceeded by brake to Shanklin, where, after visiting the Chine and other places of interest, tea was served. After tea music and singing was indulged in; then the party adjourned to the sands, and after the inevitable photograph had been taken a return was made to Ryde by brake, and at 9.20 the boat to Southsea taking the Portsmouth contingent home after a very enjoyable afternoon. The party was accompanied by Mr. S. J. Pharo, Traffic Manager.

**Preston.**—On Sept. 25 a farewell supper was given by Mr. D. Munro, Chief Electrician at Preston, on the occasion of his terminating his services with the Company to take up a Government appointment in Ceylon. Mr. Munro first entered the Company's service some eighteen years ago at Glasgow, and after serving in various other districts in the north he was, eight years ago, transferred to Preston, and during that time has had charge of the Electrical Department, gaining the respect and esteem of all with whom he came into contact. Mr. S. P. Johnson, who, in the absence of the District Manager, Mr. J. Lemon, presided in the chair, presented Mr. Munro, on behalf of the staff of the North-West Lancashire district, with a handsome travelling trunk, shaving outfit and a watch. After being suitably acknowledged, a very enjoyable musical programme was gone through. The proceedings were brought to a close by singing "Auld Lang Syne" in true Scotch fashion.

On Sept. 26 Mr. Munro entertained the operators and friends at the "White Horse" restaurant. The proceedings were interspersed with intervals for music, dancing and refreshments. After a very pleasant evening the most hearty wishes were expressed for his welfare in the position which he is about to take up.

#### LEICESTER TELEPHONE SOCIETY.

THE fifth annual general meeting of this society was held at the Foresters' Institute on Sept. 9 under the chairmanship of Mr. Melton Marsden. The president, having briefly reviewed the past session, called upon the hon. secretary (Mr. R. F. Ellison) to read the balance sheet, which, it was pleasing to find, showed a credit balance. The attendance was very satisfactory and augurs well for the coming session. The election of officers for 1910-11 was then proceeded with as follows:—Hon. president, Mr. Alfred Coleman. President, Mr. Lucas. Vice-presidents, Mr. J. N. Lowe, Mr. Melton Marsden. Hon. secretary and treasurer, Mr. P. V. Sansome. Committee: Miss Law, Miss Horner, Messrs. W. E. Pearson, E. Rendell, A. W. Garrard, W. Baker, H. C. Flint, W. J. Bailey, A. Revitt, C. Derrick (presidents *ex officio* members of committee).

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## TELEPHONE MEN.

### LIV.—CHARLES CUTHBERT WORTE.

CHARLES CUTHBERT WORTE was born in London in 1866, and educated at a private school near Uxbridge. After serving an apprenticeship with Messrs. Latimer, Clark, Muirhead & Company, electrical engineers and telegraph instrument makers, of Westminster, he entered the service of the South of England Telephone Company at Hastings, in 1885. In those days there was no organisation of methods or staff, and his duties were of a varied description, consisting of instrument fitting and inspecting, wayleave canvassing, supervision of gangs and storekeeping, and so forth.

Mr. Worté was transferred to Oxford in 1887, where the Company were endeavouring to introduce telephone service into the colleges. Although free service was offered, only one or two colleges availed themselves of it, the traditional conservatism of the University being strongly evidenced by their attitude towards the new invention.

Mr. Worté was next transferred to Dover as Local Manager, where he had his first experience of trunk lines, which were earth circuit ones, connecting Dover, Folkestone, Canterbury, Ramsgate and Margate. Whilst he was stationed there the South of England Company was absorbed by the National Telephone Company.

Subsequently he was transferred as Local Manager to Kings Lynn, and again on a re-arrangement of districts to Cambridge.

In December, 1893, Mr. Worté was transferred to Watford as Local Manager, and again in June, 1896, to Reading.

In 1897 he received promotion to the post of District Manager for the East Kent District under Mr. G. F. Preston, then Provincial Superintendent for the South of England. After remaining there for three years Mr. Worté was appointed District Manager to

the more important district of Hull. His first experience of that city was not particularly pleasant. The overhead plant had been wrecked by the severe snowstorm in February, 1900, and his first duty was to interview a number of discontented subscribers, who had refused to pay their subscriptions because they had been without their service for some time owing to the breakdown, and also because it had not been all that could be desired. In addition, there were rumours of Corporation competition. Matters were satisfactorily settled by promises of improved service on the completion of the new common battery exchange in course of construction, which was completed and opened in March, 1901.

The opening by the Hull Corporation of a system of their own in 1903 did not lighten Mr. Worté's task and the competition for business naturally became very keen. The Corporation, with all the advantage of intercommunication with the Company's system, might have been formidable rivals, but after reaching about two and a quarter thousand stations, they entered upon a period of stagnation, whilst the Company's system has increased to 8,500.

Mr. Worté has earned the respect not only of the staff under his charge, but of those under whom he works, by the calm, steady, but firm manner in which he treats his work, and many could with advantage take a

leaf from his book in this respect. He is able to keep an unruffled demeanour, which is a great asset to anyone who has frequently to face such exasperating circumstances as fall to the lot of telephone officials.

With regard to recreations, he has not yet caught the golf fever, but spends his available leisure in walking and reading.





## OBSERVATION RECORDS AND THEIR APPLICATION.

By T. M. OLDHAM, *Assistant Exchange Manager, Paddington.*

THE whole subject of service observation is a very extensive and, to my mind, a very important one, and it is entirely beyond the scope of an article such as this to deal with it at all comprehensively.

It is possible, however, that a few remarks on some of its applications may not be out of place, and it is with this idea that I have ventured to contribute the following brief article on the subject.

In considering the application of the observation returns the question naturally arises as to the necessity for observation as distinguished from supervision, both aural and visual, as exercised by the supervising and managerial staff. Since these latter have the operators continually under their personal surveillance it might be thought that they could of themselves determine whether the service being given was up to the required standard. It must, however, always be borne in mind that no matter how smoothly things may appear to the supervisory staff to be working they are in the exchange itself, and are also cognisant of all the details of the various operations which go to make up a telephone connection, and consequently everything appears quite straightforward to them.

It is, however, from the point of view of the subscriber, who is outside, and naturally ignorant of the internal working of an exchange, that this question of the service has to be considered. This is precisely where the observation officer and his local representatives step in, as they observe the service from the subscribers' standpoint to a degree which cannot be reached by mere visual supervision.

To a busy subscriber, possibly of an irascible disposition, seconds on the telephone seem minutes, if not hours, and judicious observation to ensure that no more delay is caused in completing a connection than is absolutely unavoidable, contributes to the improvement of the service and so to the satisfaction of subscribers. The attitude to be adopted should be in accordance with the old maxim to the effect that "Prevention is better than cure." This for two reasons.

Firstly, because to possess a number of subscribers who are satisfied and have no possible ground for complaint, is far better for the prestige of the Company than to be receiving multitudinous complaints and be very successful in finally quieting the complainants into a more or less dormant or apathetic state.

Secondly, merely from the point of view of the economical expenditure of energy, it is a far easier matter to give a subscriber a good service and keep him from ever acquiring the habit of grumbling than it is to satisfy him when once he finds the service really at fault and feels additionally self-righteous in consequence.

I have made no attempt to enumerate all the considerations which point to the advisability of observation of the service, as carried out, but I think the points I have mentioned are sufficient to show that it is desirable, and, if the service is to reach and maintain a high standard, not only desirable but necessary.

I will now, therefore, consider more particularly the application of the results of these observations, so that they shall be of the greatest utility. In this connection, the first thing I would mention is the important part which supervisors may take in leading their operators into taking a personal and intelligent interest in the results. I say "leading" advisedly, as the supervisor herself must first of all understand and be interested in the results before she can possibly make them intelligible, to say nothing of interesting, to the operators in her division. Until this individual interest and responsibility is appreciated by the operators the exchange manager's studies of the figures, however careful, and his efforts to improve matters, however well intended, must prove more or less fruitless.

The supervisor, then, comes into personal contact with her operators, and when the exchange manager points out to her, from the local observations, that her division has some particular weakness, she can tactfully take it up with the operators, showing them

how their own failings affect the results, and, as a natural consequence, improvement will follow. Serious irregularities, observed locally, should of course be taken up with the operator responsible at the time of the occurrence, and in this, as indeed in all dealings with operators respecting observation, the greatest care should be exercised to avoid any approach to *espionage*, or any semblance of it, and it should always be remembered, and realised by the operators, that it is *service* that is being observed and not the *servants*, the operating as distinguished from the operators.

We will now consider that section of the observations which deals more particularly with the speed of the service. Competition in this matter between the divisions may, if carefully regulated, prove a healthy stimulus. It must be supervised, however, and the ideal of the 4.5 seconds answer and clear must always be kept to the fore, as not only the average but the actual times of a large percentage of the calls handled. This means the attainment of an evenly good service, which is of far greater practical value than a service with the same average figure but composed of a number of long answers or clears, made up for, as regards average, by a number of, say, 1-second tests, which are, after all, practically useless.

Of course, in addition to the above considerations, competition must be tempered with discretion, or, in the anxiety to obtain low tests, hosts of irregularities will be introduced and the service will consequently suffer and not gain.

The application of the observation results by the supervisors has, I think, been sufficiently indicated in the foregoing, and we must now consider what study can be advantageously made of them by the exchange manager. By careful comparison each month of the observation figures (as regards traffic) with those of the corresponding month of the previous year exchange managers can see whether they are progressing in the right direction. Considerable emphasis should be laid upon the care with which these comparisons should be made, in order to obtain the necessary benefit from them. For instance, if two merely consecutive months are compared they may give an entirely erroneous idea as to whether improvement has been effected or not, as the traffic of the two months under consideration may differ so widely as to account in itself for the difference in the observation figures. Traffic is bound to affect both speeds and irregularities to some extent, and we cannot rightly estimate the success or otherwise of our attempts to improve the service without taking it into consideration.

I have, of course, only touched on the fringe of the subject of service observation, as to discuss anything but the generalities would fill a whole book, and require more able handling than mine. It will also be noticed that I have not made any reference to special observations of the operating on particular subscribers' lines. The uses of these observations are, I think, fairly obvious and, palpably, cannot be discussed in an article of this nature.

I would however, in concluding, make a few remarks as to the actual application of the results to the operators themselves. Irregularities must imply something of the nature of a fault, but nothing is to be gained by "fault finding" in the ordinary acceptance of the term. The particular failing of an operator, or division of operators, can be tactfully pointed out as one to be guarded against, and should on no account be preached about, or driven home as a terrible crime.

Much undoubtedly has been done, and much can yet be done as the result of the careful study of the results of observation, whether local or general, and their application to the particular requirements and local conditions of the exchange under consideration, and it should not be lost sight of that these figures can form occasions for encouragement quite as much as for complaint, and it is, I think, in the former direction that our effort is most usefully directed, and that will enable us to continually reach nearer to that high ideal of a perfect service which we all desire to attain.

**Electrical Engineering.**—We are asked to draw attention to errors in the advertisement of the above journal last month. The date of the issue containing the article of the new cable between England and France was March 17; that on the new Central Exchange at Glasgow, Aug. 18; and that describing the new Post Office Telephone Exchange at Willesden, Sept. 1.

## PAPERS.—THEIR WRITERS AND AUDIENCES.\*

BY EUSTACE HARR.

THE papers presented at the meetings of telephone societies, and, in fact, papers and lectures generally, may, I think, be divided broadly into three classes: the purely descriptive, the productive and the debateable; each serving its distinctive and useful purpose; each with its own characteristics, interests, and, perhaps, its own audience. The order I have placed them in is purely mechanical and is in no sense intended to suggest comparison, for it would be hard to say which, if any, of the three is entitled to priority in point of value or of importance. But it would not be difficult to allot to these three types of papers the characteristics, the bent of mind of their respective classes of author, of the men and women who set themselves deliberately to record on paper, for the interest or benefit of others, their knowledge and views of those things which particularly appeal to or attract themselves. Thus, for purely descriptive work we have the man with mastery of detail, the expert by long practice, with knowledge of facts which though not new may be fully known only to himself; then there is the inventor, the producer, for the setting forth of new facts created in his own brain and brought to an unquestionable conclusion; and thirdly, there is for distinctly debateable subjects the man of views and theories only, philosopher or dreamer, with ideas good, bad and indifferent, the fruit of which may or may not be worth the cultivation.

I have to confess to having, at one time, an inclination to rather undervalue the utility of papers of the purely descriptive or narrative type; my feeling being that to merely recount in detail the known facts of a particular branch of work was like preaching, on the one hand, to the converted, and on the other, to those who had neither the desire nor intention of being converted. I have since come to the conclusion that this view was altogether wrong. Among the hundred odd papers it has been my privilege to read or listen to, I was much much struck with one which appeared in the TELEPHONE JOURNAL for March, 1910, and which proved to me that the description of simple and, what may be to some, well-known facts, is capable of creating interest and of circulating knowledge far beyond the boundary contemplated by the author. The paper was short and tersely expressed, but alive with information, and the subject was "Screwdrivers." I had no particular interest in screwdrivers and had no expectation of gaining any material or personal advantage in reading about them, and yet the time I spent on that paper was by no means thrown away. Beyond its intrinsic value, it suggested to me new ideas of what men and women have to learn before they can claim proficiency even in work which, on the surface, seems ordinary and uninteresting; and it reminded me that much which appears straightforward or haphazard has not only cost the performer an arduous training, but has cost, too, considerable thought in the seeking for methods to achieve the best and most economical results. One effect of this brief essay on screwdrivers, then, was to present the subject to me in a new and higher light, to the broadening of my views and sympathies in regard to work and workers outside my own particular sphere, and this of itself was worth the gaining.

Incidentally, too, I noticed a remark in it too good to be passed over, almost epigrammatic, and wider in its application than perhaps the author foresaw. It was this: "It is surprising what a number of men you meet who . . . keep on using a square-ended blade for flat-headed screws."

Now, the very fact that I had learnt something in leaving for a moment my own beaten track suggests another fact very germane to my present subject—viz., that the writer of that paper when he delivered it, confronted, no doubt unconsciously, three distinct audiences mingled as one. First, those who were fully acquainted with the subject and were therefore competent critics; secondly, those who were there to gain knowledge in their particular work, and to whom therefore the paper peculiarly appealed; and thirdly, those who, like myself, would be there merely hoping, maybe, to be interested, modest and silent listeners.

which was absolutely new; his efforts were purely descriptive; but I took him to be a practical man well acquainted with his subject, competent to explain clearly useful facts acquired by observation and experience, and thereby worthy of appreciation. And, inferentially, I am led to believe that no matter what branch of our work forms the subject of a descriptive paper, there is no reason why it should not provide some interest and some profit to the critic, to those whom it instructs and to the merely curious.

But of all classes of paper, this, the descriptive or narrative, demands perhaps the greatest care in preparation, for the very simple reason that the writer being so abundantly supplied with facts allows them to follow too closely on each other's heels and thus bewilders and tires the listener. The fault here lies in an insufficiency of explanation and embellishment. The inventor is able to dazzle an audience by the novelty or ingenuity of a discovery, which of itself may be enough to provoke interest and hold the attention: the man with views or unproven theories must, of necessity, proceed slowly, reasoning out his *pros* and *cons*, if he wishes to be taken seriously; but he who sets out to narrate accepted facts and theories has become so accustomed to them himself that there is always a danger of taking too much for granted, of crediting his audience with a knowledge of terms or principles of which it is profoundly ignorant, leaving it depressed and irritated for want of a little more illumination.

For example, many papers have been written and read on the office or commercial side of the Company's work, on its book-keeping system and methods of recording its daily business routine. References are made to cash books, fee journals and stores ledgers: to the advantages of cards over the book form, and so forth; but I do not remember ever to have come across the plain definition of what a ledger or journal really is, or of such terms as "double entry," "personal" and "impersonal," "accounts," "debits" and "credits," etc. Much has been written and said of what should be or has to be done in varying circumstances, but scarcely enough, I think, of the reasons for doing it or of what would happen if it were left undone or were done badly.

All these things are commonplaces to the initiated, but to a large section of the members of telephone societies they are utterly unknown, and unless attention is paid to such elementaries you will get limited interest and attenuated audiences. True, you are specialising, and presumably on the subject on which you are best informed, but you are not lecturing to a special and selected audience, and therefore you must to some extent prepare your paper or lecture on what is commonly known as "popular" lines. Speaking generally, the larger the audience, the slower is the *average* intellect, and if it is your intention to appeal to the whole you must frame your subject in such a way as will make it possible for the whole to keep up with you. There is a by-motive in these meetings of ours which, to my mind, is one of their chiefest charms—namely, the opportunity given for the welding of departmental units and for the sympathetic recognition of each others' work; and to get this you must dig below the surface, below the dry ground of necessary business intercourse and Service Instructions, to trace and understand more of the complicated foundations of our business.

This is one of the great uses of descriptive papers, and I am convinced that already the benefit derived therefrom to the Company and to the individual is more far-reaching than is commonly imagined. And, beyond this, the dissemination of telephone knowledge week after week throughout the country by means of the voluntary labours of an enthusiastic staff must in the end react on the service to the great advantage of the telephone-using public, a public which would perhaps be astonished to learn how much indirectly it gets out of us for nothing!

In essence, though not necessarily in manner, the paper which begins and ends with pure description differs entirely from that which produces and deals with a new fact demonstrably decisive. The former represents the "I have acquired"; the latter, the "I have discovered." The success of the former depends altogether on its clear sequence of narrative, the latter on the importance, utility and ingenuity of the subject itself. Unless and until he chooses to part with it, the invention is the inventor's exclusive possession; he is the sole master of it. It rests with him absolutely to decide how far he will take his audience into his confidence; he

\* Paper read before the London Telephone Society, Oct. 3, 1910.

Bear in mind the writer propounded nothing, so far as I know, may be willing and even anxious to reveal all he knows of his own work, but on the other hand, he may find it hard to part with the creation of his brain, and to let go in one short hour the results of months of patient and persevering investigation.

But in either case he, too, has his audiences—the sympathetic, the incredulous, the antagonistic, and even the envious, and he is bound to reckon with them. They are there not only to be instructed but to be interested, and here again if the paper is to be successful *as a paper* it is the average intellect, not the expert, that is specially to be appealed to. And among every audience there is a class of intellect, a little difficult to define, but which, I believe, is not uncommon—viz., the mind which grasps quickly, but not thoroughly: that accepts half a truth for the whole, only to find on examination that it has missed a link here or there, to its ultimate mystification. This section has to be protected against itself by careful preparation on the writer's part, otherwise he will find himself in the subsequent discussion forced to reiterate what he imagined he had already clearly demonstrated.

The accustomed lecturer knows, moreover, that it is not always enough merely to state a fact; that, to say, for example, that having planted an acorn he has produced an oak is not, to the enquiring mind, the equivalent of saying that two and two make four—one of the few things, by the way, which in this world we are absolutely certain of—for the thinker, the man of science seeks acquaintance with the full chain of reasoning and circumstance by which definite conclusions are arrived at, and is satisfied with nothing less.

The inventor who has something to declare and who proposes to declare it to a mixed audience, that is to say, to the expert and non-expert, should, I suggest, take pains to address himself particularly to the non-expert. By which, please note, I do not mean the unintelligent: for to attempt to instruct the unintelligent, no matter how willing they may be to learn, through the medium of a short paper would be a difficult task. They must, for the time being, be left out of account, or the paper may lapse into tediousness. On the other hand, the writer need not worry himself unduly about the listening expert. Assuming sense and soundness in his subject, he is assured in any case of attention in that quarter, if not of approval; he expects criticism, and will get it, but will get also encouragement from those receptive minds which he carries along with him; the minds to which a mere word here and there will give a clue to his trend of reasoning; that to say "I tried this and it failed; I went back and tried that and succeeded," pictures to them the whole process which worked out accomplishment. By addressing himself specially to the intelligent amateur in the light of an intellectual, though not a technical equal, the lecturer need not fear that the interest of the expert will flag; the probable effect will be that his subject will gain in completeness without becoming tedious, and thus in appealing to the greater number he will include the less.

No one will deny that what I have called the "purely descriptive" and the "productive" types of paper are both "instructive," but it is well to note that they are instructive in a different sense. The object of the first is to explain and teach the Company's work, to make plain the why and the wherefore of this or that particular method; and the direct utility of it to the staff, as a staff, may therefore appear to be more pronounced than in the second. For, at the first blush, although every new invention in telephony is interesting to us, it is not in itself necessarily and literally instructive to each. It may never help you in your day's work, you may never see or hear of it again, but it would be a poor mind that in listening to an inventor's recital of the toil of his production failed to be impressed by, or to increase its store of knowledge from a carefully prepared description of the origin and planning of a new thing, and of all the time and care and patience bestowed upon it. If it learns nothing else, it learns how it is done.

To the writers of papers of the debateable and speculative type there are many and wide fields in which their imaginations may roam, or where their pet idiosyncrasies, healthy and otherwise, may take the air. There are two classes of writers here, the one who has something to say and the other who has nothing particular to say, but is particularly anxious to say it. The latter we can dismiss

from our thoughts, merely wondering, as Beatrice did of Benedick, why he will still be talking when nobody marks him, or we may argue, with Lord Chesterfield, that if a man has a mind to be thought cleverer than he is, it is only good nature to indulge him. The genuine writers on debateable subjects are those who not only have views, but are absolutely convinced by observation and study that those views are right, this being the safest and indeed the necessary weapon for persuading antagonists that they are wrong. On the other hand, as they are dealing mainly with theories, and not with proved facts, they must be prepared to accept defeat when contrary opinions are overwhelming.

Facts in themselves are indisputable: it is the manner of arriving at them and the use to be made of them which provoke question, interest or admiration. Abstract and abstruse ideas are wanting in this completeness, are frequently insusceptible to direct proof, and thereby offer a broad front not only to discussion, but to attack. It is clear, therefore, that the essayist must be sure of his ground, every inch of it; must be armed at all points for the defence of his views, and must be confident that his arguments are sound, whatever his audience may think about them. It is not enough for him to feel instinctively he is right, because in all probability he will be confronted with others who instinctively feel he is wrong, and whose reasoning faculties are even quicker and clearer than his own. For instant action instinct is a useful guide to follow, but a poor thing to trust to when the result is to be subjected to the fierce light of criticism, be the same ever so friendly.

Further, it is unsafe to attempt to slur weak points in a chain of argument—weak in the sense that the writer has his private doubts about them—by brilliancy of diction. It is easy enough to hold the attention by elegance of expression, by the well-turned phrase or by mere charm of manner. Eloquence has a fascination for most of us, and, for the moment, may make the wildest schemes and veriest nonsense plausible: but its influence quickly evaporates unless backed by solid opinion. Far better to take your audience into your confidence and admit that here or there you have not positively satisfied yourself that your conclusions are absolutely sound. The chances are greatly in favour of finding one among your listeners whose mind—differently trained to yours—is able to grasp results and consequences with a directness and an accuracy that leaves you far behind; provided, of course, that you have led him step by step to your point of doubt, that up to that point you have been so clear in your arguments that he has been able to gather exactly what is in your mind. And it does not follow that his success in solving your difficulty reflects on your capabilities; the original idea is still yours, only he proves by mathematical demonstration and precision that it either will or will not hold water: possessing a quality which you do not possess or which by choice or accident is developed in you to a far less extent.

And what does it matter if you are proved to be wrong? You are expressing your views, not seeking to establish a law: and the value of your views is measured by the quality and amount of reasoning you have put into them, neither more nor less: and if you are sincere you will be the first to admit that the next best thing to establishing a theory is to explode a fallacy, even though it be your own. Perhaps the two things are equal.

(To be concluded.)

#### FUNERAL OF THE LATE MR. A. T. WALLER.

THE funeral of Arthur Till Waller, whose death we recorded last month, took place at Brompton Cemetery on Sept. 20. The Company was represented by Mr. Goddard (General Superintendent), Mr. Clay (Metropolitan Superintendent), Mr. Davis (Metropolitan Stores Manager), Mr. Stirling (Metropolitan Chief Accountant), and Mr. Leslie (Metropolitan Chief Cashier), and the Staff Benevolent Society by Mr. Hudson (the secretary). Wreaths were sent by the staff of the Company and by the Benevolent Society.

**Visitors.**—Mr. C. E. Scribner, Chief Engineer of the Western Electric Company, New York, and Mr. T. D. Lockwood, Manager of the Patent Department of the same company, were visitors to Telephone House during October.



## TELEPHONE WOMEN.

## LXXVIII.—NELLIE BRADSHAW.

Among the many fields of work open to women nowadays, that of telephone operating occupies an important place. In some districts suitable openings for women's activities are scarce, but it



NELLIE BRADSHAW.

is a proof of the attraction of the telephone service that in a city like Nottingham, where the openings for women are many and varied, the type of women to be found in the telephone exchanges is as high as it generally is throughout the country.

Nellie Bradshaw, the subject of this short notice, exemplified the truth of the statement made. She entered the Company's service in July, 1897, when there were three exchanges within the city of Nottingham.

For the first two years of her service she was in the Central Exchange, but afterwards for a year took duty at the sub-exchange at Basford in the morning, and at the Central in the afternoon. In June, 1901, when all the subscribers at Nottingham were centralised in the new exchange at George Street, and the system altered from magneto-generator call and clear to the automatic call and clear principle, Miss Bradshaw was in the first batch of operators transferred to the new exchange to learn the new system. Her service has been continuous at the Central Exchange since then, and in September, 1907, she was promoted to her present post of Supervisor. Like so many of her colleagues in the service, Miss Bradshaw is successful in carrying out her duties strictly and impartially and maintaining her popularity with the staff generally.

In summer she finds her recreation in cycling, while in winter hockey claims her attention.

## LXXIX.—AMY MONTAGUE SIMS.

Miss Sims entered the Company's service in August, 1895, as half-time operator under Miss Ralph at the old exchange in Queen Victoria Street, London, then familiarly known as "Queen Vic." She was transferred to the Central Exchange at Oxford Court,

where the Head Offices of the Company were then situated, in November of the same year as a full time operator. She was still under Miss Ralph, who had left "Queen Vic." shortly before. The first headgear receiver and breastplate transmitter were used here.

Miss Sims remained at the Central till May, 1899, during which period the trunk lines were taken over by the Post Office. It was during that time that the ticket system for dealing with all calls to the small exchanges in the London area was instituted, calls being passed to the ticket operator at Central in the same way as trunk calls are passed now—viz., "Avenue, 4786; Balham, 22." All calls were dealt with in turn by the operators in charge of the small exchange junctions.

In May, 1889, Miss Sims' parents removed to Hastings, causing her resignation from the Company's service pending a vacancy at the Hastings Exchange, which did not occur until May, 1900. At that time she was appointed senior of two operators, which then comprised the whole operating staff. The present number of operators is six, with Miss Sims as Clerk-in-Charge, to which position she was appointed in August, 1907.

During the time Miss Sims has been at Hastings the number of subscribers has grown from about 200 to nearly 800 at the present time. She has worked in the Sussex district under three district managers—viz., Mr. Madgen, Mr. Taylor and Mr. Moorhouse; and three local managers—viz., Mr. Stirling, Mr. Rhodes and Mr. Armstrong.

Miss Sims is most unassuming of manner. She has no particular hobby, but is a great reader and is fond of the standard authors.



AMY MONTAGUE SIMS.

During the time she has been Senior Operator and Clerk-in-Charge at Hastings Miss Sims has gained the confidence of the staff under her, with whom she is very popular, being always willing to give any assistance required. At the same time she has proved herself a most capable official, having been able to satisfy subscribers all round in reference to their difficulties and complaints.

## DISTRICT OFFICE STORES BOOKKEEPING.

BY GEORGE THRUSH, *Stores Clerk, West Kent District.*

At a recent visit of an audit clerk the writer discussed the methods adopted in this district to reduce the figure for stores and tools per station, and also the district office stores work in general, when it was suggested that an article in the JOURNAL would be of interest and perhaps of some value to those of the staff who are engaged in this department.

In October, 1905 (the time at which the writer was promoted to the position of stores clerk), the figure for stores and tools was 18s. 5d. per station. Now it is 7s. 3d., a reduction of over 60 per cent. The greatest factor in this reduction has undoubtedly been a careful and systematic check of all stores requisitions.

Stores requisitions are sent into the district office once a week (special circumstances excepted) with the third or blank sheet (*i.e.*, the one retained at the district office) pinned at the top. Those for articles in everyday use are checked with the ledger cards, and "Quantity in Stock" is agreed. If this is correct, and the amount requisitioned does not exceed the maximum figure allowed, and the description, stock list number and address are in order, the requisition is passed forward.

Those for special articles or Head Office estimate jobs are checked with the estimate.

All requisitions are compared with "Lists of Material for Transfer," and where possible transferred locally, the remainder being then dated, numbered and sent to Head Office in the usual manner.

Where the "Quantity in Stock" does not agree, or some other detail is incorrect, a note of the discrepancy is made by the stores clerk on the blank sheet, which is then sent back to the local office for the error to be cleared up. All queries and answers relating to the requisition are written on the blank sheet, by which means unnecessary correspondence is avoided, stock is more carefully kept and all queries relative thereto are always to be found on the requisition when filed away afterwards, if required.

The benefit of the careful scrutiny of requisitions before passing is felt also at stocktaking, and the fact that this district has reduced its gross stocktaking difference from £490 to £50 and the net difference from £136 to £9 in the four years must be in part attributed to it.

Having dealt with the procedure in connection with stores requisitions, I should like to touch upon one or two other methods adopted here to effect saving.

*Material for Transfer.*—Requisitions for material for other districts are on receipt entered in a book kept for the purpose and sent to the centre from which the goods are to be supplied. There is a standing instruction that goods are to be despatched immediately on receipt of requisition. When the requisition has been dealt with it is returned to the district office with a debit slip, which is endorsed "Transfer Stock." This saves correspondence and enables the stores clerk to deal with the 124 Form at once. Any slips for material on the transfer list which is used locally are similarly endorsed, thus saving a separate advice to the district office.

*Stores Slips.*—A book is kept showing the last numbers of slips received, and entered up on Friday mornings. Missing slips are called for forthwith, and it is therefore impossible for any to be lost without the loss being discovered.

*Inwards and Outwards Books* are written up during the month as far as possible, and thus time is saved for a period at the month end when every effort is needed to cope with the monthly postings. (The figures for 149 and 296 Forms are always ready by the Wednesday following the last Thursday in the month.)

*Bicycle Accessories.*—A stock of these is kept in the district, and immediately any parts, such as tyre, chain, etc., are required they can be supplied at once, and the bicycle can thus be brought into use again some days earlier than it would be if the parts had to be requisitioned each time.

*Wire Return.*—A return of all wire, copper, bronze and scrap, copper jointing sleeves, and also all cables, is sent in from the centres monthly and checked against the ledger figure, any discrepancy being taken up and cleared at the time.

*Small Articles.*—A stock sufficient for three months of small articles, such as diaphragms, rings, cords, mouthpieces, press pieces, etc., is kept at the largest stores, and the whole of the district supplied from there from time to time as required. The number of requisitions is thus reduced and postages are saved. This method is also adopted in other cases where large quantities are supplied proportionately more cheaply than small ones. For instance,  $\frac{1}{2}$  cwt. voltoids cost 15s. and carriage, whereas 1 cwt. costs 26s. carriage paid.

*Stores and Tools for Transfer* (not in first-class condition).—A list of material which is not in good enough condition to be transferred elsewhere is kept, and this material is used up at every opportunity.

*Stores Postings* are checked monthly, which facilitates the arrival at the correct quarterly balance, and also helps to detect entries which may have been posted in wrong columns on ledger cards.

*Average Prices* for instruments and other expensive items are struck every few weeks, preventing any abnormal prices, and fresh average prices for all accounts are struck at the end of April, the result of which shows itself in an absence of credit accounts on the stock sheets.

*Adjusting Slips.*—In view of the difficulties which might arise through the issue of "adjusting slips" of any description, none are passed unless they are certified by the local manager and chief clerk and bear a reference to the slips which are adjusted.

*Outstanding Requisition Book, etc.*—In an article in the JOURNAL last year Mr. S. G. Hare referred to this book, which is, however, now obsolete. In this district the blank sheet counterfoils of the requisitions are kept in numerical order on a Shannon file until the debit note or invoice is received. They are then transferred to another file, to be placed away in batches of 1,000. This does away with the necessity for this book.

In the same article I see that the stores clerk makes out slips for articles purchased locally per No. 5 Return. Here the credit slips are made out at each centre for any tools or stores purchased locally, and forwarded in the usual manner.

It is also stated that material for sales works orders is charged at stock list price. Here material for R. C. and fire insurance works orders is debited at stock list price as well.

If any of my fellow stores clerks or other workers in this important department derive any benefit from the few remarks I am privileged to make in this number I shall be amply rewarded.

## THE PUPIN SYSTEM APPLIED TO AERIAL TELEPHONE LINES.

(From Dr. EBELING's paper, continued from page 148.)

*Bi-metallic Line Berlin-Stralsund.*—After the good results obtained by the employment of coils on the Berlin-Frankfort line, the Imperial Administration decided to make a new trial by applying the coils to a bi-metallic line, *i.e.*, a line of iron wire covered with copper. The trial was made on the Berlin-Stralsund line (about 240 km. long) composed of this bi-metallic wire, about 4 mm. in diameter. The coils were inserted about every 4 km. and placed in pot-shaped receptacles (Fig. 9), whilst the form of lightning arrestor was as before. The new form of receptacle was adopted because the Berlin-Frankfort line was not faultless from the mechanical point of view, the ebonite sleeves often breaking during attachment to the ironwork. Fig. 10 shows the new form of apparatus mounted on the iron arms. A notable improvement in the volume was observed after the insertion of the coils.

*Bi-metallic Line Berlin-Hamburg.*—This line, which is about 920 km. long and composed of bi-metallic wire of 5 mm. diameter, was likewise equipped with coils of the same form as those employed on the Berlin-Stralsund line. Without coils this line might be considered as equivalent to a bronze line of 3 mm. With the exception of a few short sections it is run along the railway on the same posts as the telegraphs of the Post Office and State railways. Certain relatively loud noises arising from the parallel

telegraph lines were observed, and trials were made to see if these could not be diminished by systematic crossing of the wires every  $\frac{1}{2}$  km., with very good results. When the wires were crossed throughout their length the noises did not completely disappear; it was found that the solderings of the bi-metallic lines to the coil apparatus was not perfect at all points. When these defects were removed the noises diminished noticeably although not entirely.

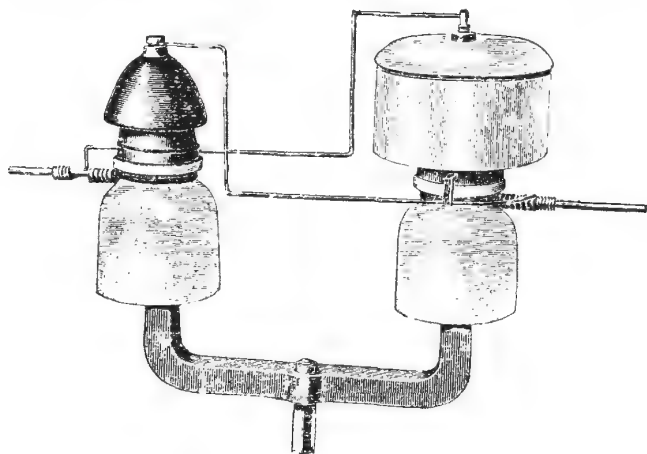


FIG. 9.

It was therefore necessary to ascertain which were the telegraph lines which did and did not occasion the disturbances, with the result that it was found that the Morse lines produced no appreciable disturbance, the Hughes lines a perceptible disturbance, whilst the most considerable troubles were produced by the Wheatstone lines. The Siemens telegraph also occasioned disturbance owing to its higher frequency. These disturbing noises

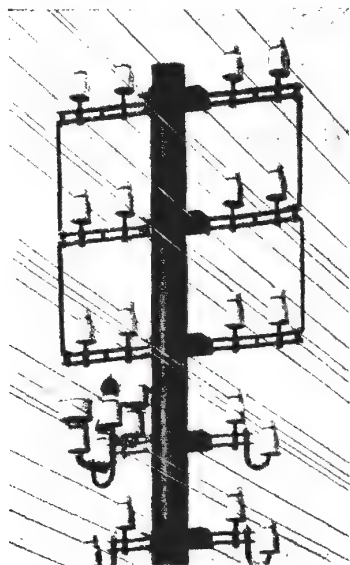


FIG. 10.

were minimised by inserting an appropriate self-induction in the telegraph line producing the disturbance.

When inserting such inductance apparatus on telegraph lines it was possible when the insulation of the telephone line was normal to lessen the disturbances produced even by the Wheatstone lines to such a point that it could not longer be determined, except when it was known that the Wheatstone line was actually working. As to the disturbance from the Hughes lines these were not perceptible after the insertion of the inductance coils, but when the coils were put out of circuit the noises were immediately perceptible anew. It was equally impossible to ascertain the

inductive effect of the Siemens rapid telegraph after the application of the inductance coils. The above-mentioned device does not give a perfect result when the telephone line is out of order owing to insulation and contact faults; then, however, similar noises would arise on ordinary telephone lines parallel to telegraph lines worked on the Hughes and Wheatstone principle.

It is not astonishing that a pupinised line should be more sensitive to induction than a non-pupinised line of the same diameter because the capacity of the line is increased by the employment of coils; but according to the observations made by the Austrian Ministry of Commerce on the sensitiveness of aerial lines with single coils on the Pupin system this is not the undoubted principal reason of the increase of sensitiveness, the reason being probably that telephone lines themselves are very sensitive to disturbances of symmetry. The single coils were well made in as uniform a manner as possible, but the modifications to which they were exposed by atmospheric discharges were liable to differ on the A and B circuits, thus disturbing the symmetry. It is very probable that such different disturbances are produced in the coils. . . . The Austrian Government, in using double coils, have apparently suppressed, or at least greatly weakened, the particular sensitiveness of

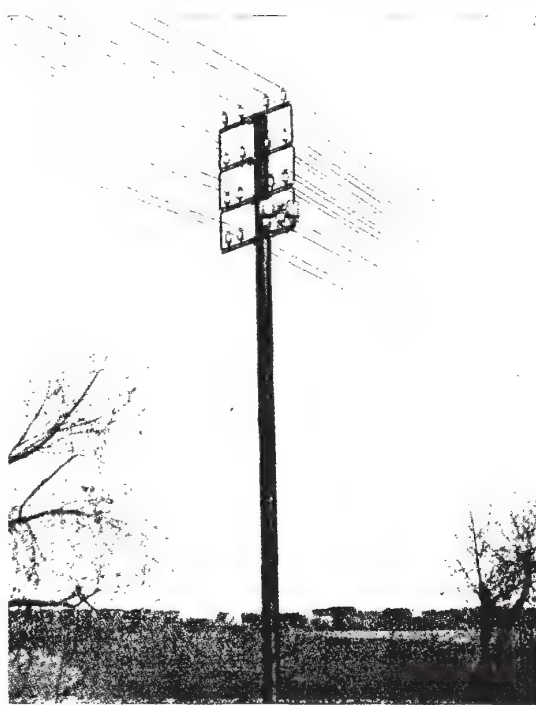


FIG. 11.

the line to telegraphic noises, but we cannot be sure if the bi-metallic line would not all the same give rise to difficulties, owing to the peculiarities of the metal, the more so as the number of disturbing Hughes and Wheatstone telegraph lines run on the same poles was very great, and as it was desired to avoid complicating the telegraph service by reactionary coils, it was decided to take out the coils without making further trials.

The volume was naturally greatly increased on the Hamburg-Königsberg line by the use of coils.

*Berlin-Frankfort-on-Main Line (Second Equipment).*—As the apparatus originally installed on this route was not sufficiently capable of withstanding wear, as we have already said (although the quality of the transmission had not yet suffered) the Siemens and Halske Company decided to replace the experimental coil apparatus with the more mechanically perfect pot-shaped apparatus.

As the line lent itself admirably to theoretic trial, owing to the existing comparable lines, it was decided at the same time to profit by the occasion to discover in a more exact manner to what point the theoretic values agreed with the practical values in the aerial Pupin lines. It was required to use appropriate coils to give the



bronze Pupin line of 2.5 mm. the capacity of an ordinary bronze line of 4 mm. From the first equipment it was merely possible to observe, judging by the volume, that the Pupin line ranked between the ordinary bronze lines of 4 mm. and 5 mm. respectively. As the capacity corresponds nearly to the section of the wire, this means that the trial line with a capacity of  $2.5^2 = 6.25$  can be raised by the employment of coils to a capacity of from  $4^2 = 16$  to  $5^2 = 25$ , but these limits are so wide that it was desirable to bring them nearer together.

The speaking trials which were made after the change of apparatus shows that the results were improved, as was expected. At the same time it was always observed that the line showed several disturbances, the causes of which were determined by careful research. It was found that the apparatus did not resist great changes of temperature. During different periods of great cold in the course of the winters of 1906 and 1907 a large proportion of the porcelain caps cracked, letting the damp penetrate and producing bad contacts.

#### Protective Apparatus with Metallic Cap.

*Berlin-Frankfort Line (Third Equipment).*—This line was equipped with apparatus fitted in such a way that its insulation would not suffer by the insertion of the coil apparatus and was carefully constructed in accordance with the results of experience acquired. Fig. 11 shows the type of apparatus employed, and Fig. 12 shows

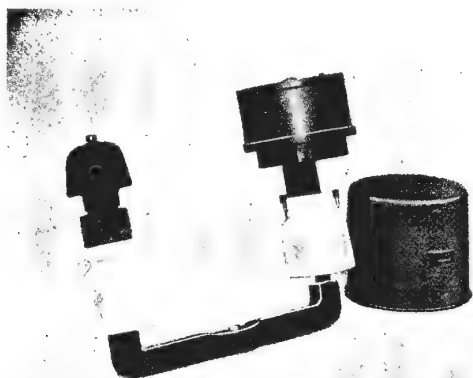


FIG. 12.

the details. The coil is enclosed in a metal cap completely soldered, from which the wires come out by means of porcelain insulators. It only remains to render the insulators watertight. This is very important, because it alone can give rise to disturbances. The protective metal cap prevents the rain from diminishing the insulation. Further, it may be said, there is nothing more to fear from deterioration due to mechanical causes. The coil apparatus is screwed on the insulator so that it can be conveniently changed at need. Here also the lightning arrestor is independent of coil apparatus.

The coils are the same as those of the second equipment; some have been merely adjusted so that the change of apparatus may be made little by little without delay.

The values of the coils were tested during the change; it was found that they had remained constant or changed very little. The average value of the inductance of the coils was 0.105 henry and the greatest variations were, in general, 0.010 henry or 10 per cent., but all the coils returned to their original values when they were demagnetised. The mean resistance of the coils was about 5 ohms. We may deduce  $\beta = 0.00176$ , i.e., that the line is almost exactly equivalent to a line of 5 mm. diameter without coils. As the length of the line is about 580 km., we get  $\beta = 1.02$ , whilst for a line of 540 km. length and diameter of 5 mm. the values of  $\beta l$  is 0.95.

When the line was re-pupinised the same result was obtained (as was to be expected) as from the second equipment, that is, the Pupin line of 2.5 mm. was completely equivalent to the line of 5 mm. without coils. It was thus recognised that the two lines gave exactly the same results, not only as regards volume, but also as regards clearness of speech. The practical telephone engineer

estimates that the ordinary aerial line gives the best communication as regards articulation. It may be asked whether as regards clearness of speech, i.e., of the timbre of the voice, the aerial pupinised lines are behind the ordinary lines without coils. According to the preceding, this is not the case.

We have compared the lines according to a method for which we are indebted to Professor Breisig (relative to which information will probably shortly be published). The values of  $\beta l$  for a cable existing in his laboratory have been determined with great precision. We give, however, the results obtained in ordinary practice. The following table gives the values obtained for  $\beta l$  at two different dates for the 4 mm., 5 mm. and Pupin lines; the mean value observed is given in a special column, besides which is a column indicating the calculated values:—

Line.	$\beta l$		Mean.	$\beta l$ Calculated.
	Observations.			
5 mm. ... ..	1.4	1.2	1.3	1.0
4 mm. ... ..	1.9	1.9	1.9	1.5
Pupin line 2.5 mm. ...	1.4	1.2	1.3	1.0

It is seen that the relative calculated values accord very well with the observed values; but they are not absolute values, since the divergencies are considerable.

New speaking trials were then made after having joined up on each of the three lines a line of 200 km. bronze of 2 mm. diameter. The following tables indicate the observed and calculated values; for the last it is assumed that the value of attenuation of the additional 200 km. is  $\beta l = 1.8$ .

Line.	$\beta l$	
	Observed.	Calculated.
5 mm. + 200 km. 2 mm. ... ..	2.9	2.8
4 mm. + 200 km. 2 mm. ... ..	3.3	3.3
2.5 mm. Pupin + 200 km. 2 mm. ...	3.4	2.8

Making deduction of a variation of  $\beta l = 0.1$ , which was easily produced in the comparative speaking trials, observation and calculation were in exact accord on the non-pupinised lines. As regards the combination of the Pupin line and the 200 km. line of 2 mm. wire, observation accords with the trials of conversation, the result of which is that the capacity of that combination is equivalent to that of the line of 4 mm. combine with the 200 km. line of 2 mm. wire. The concordance noticed between observation and calculation in the case of the non-pupinised lines in this table may possibly be attributed only to chance. New experiments will show whether this is so. In any case the result of these tables is that the calculated values do not vary much from those obtained in practice.

The Berlin-Frankfort line has now been in regular service for almost a year with this new apparatus, without the least mischance happening to this apparatus or to the arrestors, although the line has been subject to the stormy period of last summer and the periods of cold of the previous winter.

The results described above, which were obtained from comparative speaking trials on the lines from Berlin to Frankfort, appear to be confirmed by the measurements recently made by the oscillograph.

(To be concluded.)

#### THE REGISTER CLERK.

By W. J. HOWE, London.

ALTHOUGH in various issues of the JOURNAL accounts have from time to time been published, describing the organisation of the Metropolitan Office, yet these accounts have been in general only and have not dealt with the actual work of a particular department. An attempt is therefore made to show in some detail the various duties allotted to those who fill the position of register clerks in the London offices. As already shown in these pages, the subscribers are divided alphabetically into seven sections, viz., A—B, C—E, F—H, I—L, M—P, Q—S, and T—Z. A little consideration will show that under this division some sections are naturally heavier than others. This year a further subsection has been made in the extraction of all accounts with boroughs, guardians and such corporations (which previously formed part of the A—B). These

are now dealt with separately by two clerks, who also take under their charge the rentals of such well-known firms as Whiteley's and Lyons and certain of the railway companies and docks, whose accounts are heavy and intricate and thus form the "Special" accounts. To gather some idea of the work, it would be best perhaps to consider a typical day's routine of a register clerk. On arrival he is confronted by eight piles of registers which are stacked on the office counter by the counter attendant, who is responsible for these books in their transit by trolley to and from the strong room in the basement. Having with great zest hurled his books into their proper racks, attention is at once turned to some old friends, who generally figure largely in the writing of a TELEPHONE JOURNAL paper—namely, the works orders. The No. 3 clerk keeps a manifold book for each section in which is recorded all the numbers of the works orders which he passes on to the register clerks for attention. These works orders are dealt with each day and at its close they are handed over to a clerk who checks all entries and then the works orders are sent on to the Statistical Office to deal with. Of course, in time of stress it is not always possible for the day's works orders to be returned the same day, as the number constantly varies and its fluctuations are often considerable, it being possible to call to mind a day when only three were on the list and another when 64 were dropped on the unlucky register clerk. The term "unlucky" is used because by some peculiar concatenation of circumstances a heavy day or series of days usually occurs when a great deal of time is occupied by other matters contingent on the work.

Dealing with works orders, it is the object of the register clerk to debit all new lines first, so that the accounts may be collected without undue delay. If any special murmurs could be made on the question of completed works orders, it would doubtless be the illegibility of the writing on many of them. Of course, allowance has to be made for different circumstances, but if a fitter or other official concerned with the closing of a works order could see the troubled face of some unfortunate fellow trying to decipher lengths of wiring on the back of some slip, which has the appearance of a jig-saw puzzle promiscuously arranged, he would no doubt see that lucidity of detail facilitates bookkeeping to a greater degree than perhaps he had previously imagined. Moreover, a loss of time very often ensues, when, owing to doubts on the part of a register clerk the works order has to be returned for figures to be verified. These queries cannot very well be dealt with over the telephone, as it is necessary that the questioned one should have the works order before him. A pleasant failing that occasionally varies an otherwise dull works order, is when a note is made on the issue of the works order number H.S. 147 is allotted, the completed slips bear number H.S. 741. Merely inversion of numbers, you remark; but you cannot chance that solution being correct, nor indeed any sort of thing in the Company's work, so that time is again lost in discovering what has really been done. It would really be waste of the reader's time to recount the multiplicity of incidents of this kind, yet there is no doubt some humour in them all, as otherwise why are they met with so often in our JOURNAL. Of course, there is a time when one thinks that Artemus Ward is among us, as one reads how "a whol was bored in the wall."

Works orders dealing with recoveries and removals then follow, together with those known as "change of name." Owing to the alphabetical divisions of the registers, these latter constitute practically a recovery in one book and a new line in another. An alteration from "brown" to "black" is naturally appreciated for obvious reasons. Transfer works orders or changes of rate are preferably dealt with from the due date when merely an increase or decrease of rental is involved. Should the alteration occur later in the year and the subscriber is already on the message rate system, the full year's rental at the unlimited rate is debited to him, and allowance is made for the unused subscription under his old contract, that period being written off as an adjustment. Reference is made at the time to the local fee journals, the position of the subscriber's account is ascertained, and, if required, any debit is included in the statement, or he is credited with any unused deposit, as the case may be. In order to expedite the collection of these, which, when retrospective, are already much overdue before the works order reaches the register clerk, it has been arranged that immediately after the issue of the works order, when the contract

is taken by the Stamping Department to the message rate journal clerk to note, the position of the account is then learnt, details put on a slip, which is attached to the contract so that the register clerk (who is at once advised) can forward the necessary account without delay. Broken periods or entries for additional apparatus are debited for a full year direct to the main entry. On the top slip of the works order is noted the main register folio, and also the date to which the rental is to be charged, that is, the day prior to due date. Then when the batch of proportionate periods is completed in the main registers, their entry is merely a simple matter, as all necessary data are shown. A separate register is kept entirely for such *pro rata* charges.

Early in the morning the query book is received from the Cashiers' Department. Here are entered all those payments which do not agree with the accounts returned with them, and also those of subscribers who treasure the Company's statements too much to part with them. To clear the book without delay is the chief thing, for it may be that some subscriber who now pays is disconnected, and it is as well to join him up forthwith, as, although he may be slow in paying his account, he seems to be fairly active if the service is not at once restored.

In the event of any letter needing a reply coming in with the cash, it is handed to the officer in charge of the Correspondence Department concerned. His initials are obtained to the entry in the query book and a note therein made that the receipt is to be sent to that department. In cases, too, where short payment has been made by the subscriber, the Correspondence Department is again approached in the same manner. By this means the desired attention can be given to any request or complaint far earlier than if the letter had to wait until the receipt had been made up by the Cashiers' Department. Moreover, it is possible that in the future questions may arise as to whether the deduction made by the subscriber had been dealt with at the time, but reference to the query book will at once settle any doubt.

The query book is then passed on to the Trunk and Local Fees Department, leaving the register clerk to make further progress with works orders until the receipt of the cash book. Posting is at once done, and during the early part of the month this is no light matter, as a very heavy response is usually received to the renewal accounts sent out on the last day of the preceding month. Later on in the month the amount of cash becomes somewhat less, but then the notices are due, and all erring subscribers have their attention called to their omission once each week for a fortnight, and then, after a letter of explanation pointing out the position of affairs, the Company carry out an alteration to the subscriber's circuit which usually has the desired effect. It is hardly necessary to mention the care taken in posting, for an omission to post, which may lead to the subscriber receiving the treatment mentioned earlier, may cause a flutter in the registerial dovecot. When all rentals are posted, the cash book is handed to the outstanding clerks to deal with. It may be mentioned that all rentals paid which are more than a month overdue are referred to the outstanding clerks the first thing in the morning so that in the event of disconnection of the service, advice can at once be given to the exchange to reconnect.

In the afternoon, correspondence is usually tackled, as, until the day's cash is posted, enquiries as to payment of accounts cannot be answered. No papers are kept by the register clerks. In the event of accounts being required in connection with correspondence, these statements are always made out in triplicate; a piece of thin paper being used for the first copy. This enables a record to be kept with the papers themselves and one to be kept in the account book for reference. Correspondence which has held up an account temporarily is sent over to deal O.P., *i.e.*, ordinary procedure, and, if required, a notice is at once sent. By the bye, a new lad, in sorting out papers, seeing some conspicuously marked "O.P." was at a loss to find that department.

At four o'clock, the counter cash books are due. These contain cash which has come in over the counter and by post during the day. It may be mentioned that the cashiers are subdivided in a similar manner to the rental register clerks, there being a set of cash books to each section. These dealt with, notices are then marked off in the registers for overdues. Owing to the number of subscribers who do not see eye to eye with the Company as to

payment of accounts on the due date, those concerned in the preparation of these notices have their time fully occupied. The checking of these notices day by day is facilitated by the splitting up of the books into days, all accounts due on the first being on folio 1, *et seq.*, and so forth. Renewal accounts are prepared so as to be ready for checking at least two days before the end of the month.

In London there are six separate contract agents in various districts, and each agent sends in on the 28th of each month a list of subscribers due during the following month, with which he is dealing and for which he wishes the accounts kept back: also any rentals due in previous months which are still in hand. Note is duly made and when checking, these accounts are held back. However, should these names not appear on the list a month later, it is understood that all contract matters have been settled and the rental is then dealt with as usual. In the event of settlement by the contract agent during the month, the Chief Accountant is at once advised to render the account.

Some months ago details were given in the *JOURNAL* of the "particulars," or, to give the more familiar name, "pars" form. Before the contract agent can deal with any letter concerning notice to cease, etc., it is requisite that he should have all information regarding the agreement and rental. Request is made by telephone to the register clerk concerned who calls through the details after filling up the "pars" form, which is then sent on to the agent with the day's mail, as confirmation of the telephone message.

The accounts for the month despatched, the register clerk is at once involved in the job of the month—namely, the cash balance. Every item is checked from the cash books into the outstanding book and registers, and then the cast is made and the cash agreed. These last two very short words are sometimes productive of many very different ones before the desired result is attained. The agreement of the arrears for the year is a matter known to all concerned with register work, but at the present time transference of outstandings cannot be made in all the London registers as they are in the throes of being re-written, the registers commenced in 1905 now being full.

In so short an effort as this, it is not possible to give more than an outline of the routine carried on, or more than a cursory glance at the various tasks which come round at their allotted periods. For instance, many a register clerk has recollections of heated discussions, often very one-sided, in connection with the rentals in advance book. But, perhaps, some idea may be gathered as to the way in which the register clerk occupies himself, and any deficiencies in the description will perhaps be kindly overlooked by the indulgent reader.

## THE RELATION OF THE ENGINEER TO THE TELEPHONE INDUSTRY.

By FRANK F. FOWLE.

(Continued from page 141.)

### PART II.—THE ENGINEER'S FUNCTIONS.

The starting point in a telephone system is the development study. It comprises a careful study of the territory to be served, conducted for the purpose of ascertaining the amount of business which may be immediately developed, and what amount may be developed in the future. It determines the proper size and character of plant for the initial installation, and makes possible such a design of the plant as will permit of future extensions in the most economical manner. Results of such a study will decide the location of present and future exchanges; they will determine what portions of the distribution system should be in cable and in open wire; will show what amount of spare facilities ought to be provided for in the initial installation; will fix the proper amount of copper and iron to be used in toll, trunk and subscribers' lines; show what type of system should be employed in each exchange; and will be of vital importance in fixing the initial rate schedules for local and toll service. Above all, they will insure, so far as can ever be predicted in advance, that the plant will be adequate to give good service at the start and in the future, and at the same time no

more than adequate, while the cost will be at the lowest point consistent with the desired result.

Such a study should precede the construction of every plant, and it should be scientifically and carefully made. There are probably few more costly mistakes made than those which arise from a superficial study or no study at all. In a rapidly growing system, the development study should be extended and corrected, or brought up to date, every few years. There is no other way to make the plant extensions properly and economically. The penalty of making mistakes is almost unavoidably extra expense. When they come it is too late to mourn and say how wise it would have been to spend something to avoid them. Mistakes are but human, it is true, yet every mistake carries a lesson which, profitably applied, lessens the chance of a repetition. This leads to the general observation that the engineer's province is to guard against mistakes which otherwise would occur to the detriment of the business and the loss of profits.

The working out of a development study involves a careful study of the probable traffic to be cared for and the most economical methods of handling it. This portion of the work determines the size of central office installations, the number of trunk circuits and the number of toll lines. The methods of handling local or exchange traffic are largely standard, but in deciding upon toll traffic methods there are opportunities for the display of a good deal of careful judgment. Circuit loads, in toll service, are the measure of economy of operation, and have a vital bearing upon rates and earnings. The choice of methods which will secure the highest loads is an important feature.

Another feature of development studies is the question of transmission and the design of circuits with reference to the weight of copper and iron, especially the former. In cable design this is the all-important feature. The cost of cable circuits is largely dependent upon the weight of copper; the conditions are different for local service, trunk circuits and toll lines. The efficiency of toll lines is often seriously affected by the selection of improper cables for the terminal sections. For any toll circuit of given length and efficiency, comprised partly of cable and partly of open wire, there is always a particular choice of conductor sizes which will give the desired transmission at a lower cost than any other combination of sizes. This principle is of governing importance in designing terminal cables for toll lines. The design of common battery cable distribution systems is affected by the further consideration of supplying the necessary transmitter current to each telephone station from the central office battery: the choice of cable conductors here affects transmission both in the ordinary way and in the respect that it limits the volume of the transmitter currents.

The selection of equipment and apparatus is another feature of the greatest importance, which requires judgment and experience. The principal considerations are suitability of type, electrical or transmission efficiency, grade of materials and workmanship in manufacture, first cost, and annual charges for maintenance, depreciation, taxes, insurance and interest. The quality of equipment has probably as much bearing upon the character of the service as the design of the distribution system, the trunk circuits and the toll lines.

The problem of selecting the economic locations of central offices, as nearly as possible under the local conditions in each case, has been treated in articles and papers by several engineers, so that it need not be dwelt upon extensively. Broadly speaking the problem is to find the location which makes the cost of the distribution system a minimum. In the case of many small plants there is not a great deal of choice in this respect, but the question should never be passed over without any study whatever.

The preparation of plans, specification and estimates for construction is a phase of the engineer's work which is quite well understood. The difference between building a plant without them and building it properly is all the difference between guesswork and scientific method. In this connection it should be mentioned that one of the valuable features of engineering is supervision of the construction, from inception to completion. Here the engineer becomes the representative of the owner, to see that specifications and contracts are duly lived up to, that the materials are those called for, and that the workmanship is of the desired character. The engineer, having prepared the plans and specifications, is the person best qualified to perform this service, and it is worth all it



costs. Unless the owner does his own construction, which is not frequently the case, the work is let under contract, and the owner cannot then be assured that the work is properly done without some one to represent him in supervising and approving it, unless he gives it his own time and is qualified to pass on it.

It was stated before that the operating field offers one of the large opportunities for the engineer to prove the value of his services. This is true just to the extent that the engineer is experienced and has the confidence of the owners of the property. In some cases he is called upon to advise in regard to nearly all matters of operation, but in others, unfortunately, he is not. Every expert who has been called upon to examine telephone properties knows how true this is, and can point without doubt to at least several if not many instances where operating questions have been mishandled because proper advice was lacking.

A reference again to Fig. 1 will show, under the head of operation, the scope of operating matters upon which a fully qualified engineer is competent to advise. It must be patent to those who are closely familiar with telephone operating matters that questions arise almost daily which are at least partly technical in character, and many are wholly so. The traffic principles which enter into the design of a plant are no different from those which apply to its operation. Design is based in large part upon a preconception of the mode of operation, and hence the engineer who designs scientifically has, of necessity, given much consideration to operating questions.

The maintenance of a telephone system, when efficiently conducted, involves engineering questions on every hand. The effect of poor maintenance upon the quality of the service is probably second only to expedition in handling traffic; and indeed it may be so poor as to demoralise the service entirely. No plant, unless it be a very small one, can be efficiently maintained without proper records and maps, and without comparative trouble reports showing the causes, lengths and frequency of service interruptions. There are problems of organisation, methods, periodical tests and inspections, unit costs and relation of maintenance standards to service. The whole maintenance question resolves itself into two parts—one, the correction of those troubles which interrupt the service, and the other, the periodic inspection of the plant to anticipate those troubles which are developing and thus forestall their occurrence. Service interruptions lose revenue, or at least congest the service.

It is axiomatic in all forms of public service, that the higher its quality the more it costs. The patrons of every company expect good service, and as a matter of business policy good service pays better than poor service in the long run. One of the factors in such a policy is a high class of maintenance, which in turn depends upon scientific methods, or otherwise stated, upon the application of engineering principles.

The traffic department offers again a fertile field for the engineer to prove his value. The problems in traffic handling become of a complex order in large plants; and in some instances require an expert and a staff of assistants, constantly engaged with this question alone. The study of traffic forms the basis of determining the needed plant extensions from time to time, and is one of the principal features in a determination of rate schedules. In order to maintain a uniformly high grade of service, the traffic growth must be known, and future plant requirements must be sufficiently anticipated to give ample time for installing the needed extensions. The growth of traffic will permit occasional changes in operating methods, so as to secure higher loads and economise in plant.

The value of studying local traffic is two fold: it serves as a basis for adjusting the hours of assignment of the operating force to conform with the hourly loads and thus reduces the labour cost per call to a minimum; and it serves also to indicate beforehand the need of additional switchboard capacity and inter-office trunks. The study of toll traffic serves as a guide in the selection of operating methods, and provides the means of anticipating the need for additional circuit and switchboard facilities.

There is, of course, no absolute way to predetermine traffic, but a study of daily and hourly loads in any system reveals a remarkable regularity in traffic demands from day to day and week to week. This suggested to the minds of some engineers the possible use of the mathematical theory of probability, and

considerable success has followed their efforts to evolve formulæ or laws in regard to the relation which exists between circuit loads and delays to service. Much of this investigation has been confined to local trunking systems between central offices; but it applies as well to toll circuits. It may seem remarkable to many that theory and practice have such a relation as has been worked out in this instance, but it illustrates in one more way the value of applying scientific methods to the industry.

The rate problem is ever with us in some form and it would have been a most happy event, in many instances, if the engineer had been called in to solve this question. It is fortunately coming to be recognised throughout the country that public utility rates should be based on a scientific analysis of cost, in every case. And it is further recognised that the rates which are remunerative in one locality are not necessarily so in other localities; or differently stated, the rates in any locality must depend upon local conditions.

Close to the rate question is the problem of depreciation and how to meet it. This is primarily an engineering question, rather than one for the accountant. The latter is concerned with the proper method of charging it on the books, but not with the problem of how much shall be charged. Many companies have operated for ten years, more or less, without making any provision out of their earnings to meet depreciation and the inevitable day of rebuilding the plant, in whole, or piecemeal. If their rates were to be fixed to-day by a legislature or a city council, under the terms laid down in the decision of the Supreme Court in the Knoxville case, the folly of their course would immediately be apparent. That decision recognises no adequate excuse for failing to provide against depreciation and lays down the rule that a reasonable profit may be earned only on the present value—not on the actual cost or the reproduction value. The effect of this on a company earning 8 per cent. dividends, with a plant depreciated 25 per cent., would be to reduce the dividend rate to 6 per cent.; if the legislature or council fixed a reasonable remuneration as 6 per cent., the dividend rate could be only  $4\frac{1}{2}$  per cent. The useful life of a telephone property is properly a matter for the engineer to decide, and it is for him to decide, and it is for him to state the physical condition of the property at the end of each year, after which the yearly charge for depreciation may be fixed.

There are numerous other fields in plant operation which need the engineer's skill and advice: among these may be mentioned the prevention of damage to underground cables by electrolysis, the protection of overhead lines at high-tension crossings, the prevention of inductive interferences from foreign circuits of all kinds, and the investigation of new inventions and improvements in the art. All the operating features could not be taken up without making a treatise on the whole subject of telephone engineering, in great detail. There is not space to mention even all of the general topics under the head of Operation in Fig. 1, and something must be left to the imagination of the reader.

The manufacturing side is one in which the engineer finds an almost unlimited field for the display of his ability and inventive genius. A reference again to Fig. 1 will indicate the general scope of the engineer's activities in this line. A thorough knowledge of the needs of operating companies must be the starting point of successful design, and the best course of preparation for the designer is an operating experience. The manufacturing companies have been slow to recognise the importance of the transmission problem in equipment design. It is a fundamental principle in transmission that equipment must be proportioned in its electrical design with careful regard for the type of circuit and class of service for which it is intended. Maximum efficiency can be obtained in no other way. The full realisation of this result requires both careful theoretical study and careful work in the laboratory. A well-equipped laboratory for transmission testing and the study of transmission losses is really indispensable to every progressive manufacturer of equipment.

It would be unfair not to add here, however, that manufacturers have brought their equipment to the highest state of perfection in many respects, and have shown great progressiveness in breaking away from many of the poorer practices of the early days of the art. Competition has brought this about and will always be the predominant force in the progress of the art.

*(To be concluded.)*

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[No. 56.]

## POLITICS AND TELEPHONE DEVELOPMENT.

FROM politics—party politics, that is, in the commonly accepted sense of the term—the JOURNAL has naturally always stood aloof. They are as foreign to its scope as to that of the Transactions of the Philosophical Society or the Buddhist Review. Alike to Free Traders and Tariff Reformers, to the votaries of Open and Closed Doors, to Food Taxers and Land Taxers, Devolutionists and Revolutionists, the telephone extends its beneficent service, even as the rain falls upon the just and unjust. But there is an aspect of politics which concerns telephone men very nearly—namely, their relation to the development of the service. Do party considerations make for the efficient development of the telephone in countries where it is controlled by the State? We think it is manifest that they do not.

If there is projected any reform, any inauguration of important policy with far-reaching results for the future of the service, it is before all things important that the consideration it receives shall be judicial and impartial, the ripe determination of experts and men of affairs. Now the last quality which is usually expected of or obtained from party politics is impartiality. The politician instinctively "takes sides," and his supporters follow; they hardly desire to know the merits and demerits of their case. The fact that the contrary view is upheld by the other side condemns it *ipso facto*, and arguments from that side are held to come from a poisoned source, and must be discounted.

The fact, too, that the policy of a telephone administration, which ought before all things to be stable and continuous, is at the mercy of shifting public opinion and all the hideous vote-catching expedients of general elections cannot be to the benefit of the service. It can easily be conceived how one party which believed in the great economic value of an efficient, widely extended

telephone service and laid down plans for a generous expenditure, making a far-sighted provision for future needs, could be turned out of office by another party which, making economy their cry, would starve and cripple the service in such a manner as to place their country in the rear of neighbouring nations in the march of progress for many years. Even a purely financial question such as the fixing of the basis of rates can be made a question of party, and that the telephone Progressive cannot rely on an enlightened attitude in any particular party has been curiously evidenced of late in Australia and Germany.

In the former country a much-needed rate reform, establishing the telephone on a sound financial basis and providing for fair payment in accordance with the amount of service received, has been tossing in the welter of party politics for some years, and is now being brought into force by a Labour Cabinet, presumably because it takes the view that the wealthy man does not pay his proper proportion of the cost of the telephone. In Germany, on the other hand, we have the strange spectacle of the Socialist party opposing the abolition of the flat rate (a rate by which the rich, large user gets unlimited use of the telephone at a low price unquestionably at the expense of the poor, small user) because the proposed new rates give some fancied preference to the Agrarian party, that is, to the country at the expense of the large towns. These new rates were drawn up by the German Post Office nearly three years ago and are not yet in force. They are the result of the mature deliberations of expert officials and are considered by them desirable both from the financial point of view and that of ensuring the best development of the telephone. If their adoption can be thus delayed in a country like Germany, where the Government is not dependent on the fluctuations of the electorate, it can be imagined what would be the fate of the cherished schemes of an administration in more democratic countries when once the dust of party conflict was stirred up.

## ATTENDANCES AT TELEPHONE SOCIETY MEETINGS.

IN the list of telephone societies, which we published in our September issue, we gave also some statistics of average attendances. These were seen to vary from 16 per cent. in the largest centre to 90 per cent. in one of the smaller ones. This apparent inverse proportion of the percentage of attendances to the size of the centre is, of course, not maintained throughout the series, but it holds good in a great number of cases, and provides a rough explanation of cause and effect, which, while it does not detract from the meritorious enthusiasm of the members of small telephone societies nor account satisfactorily for the disappointing attendances at the meetings of some of the larger ones, merits some consideration. Members of societies numbering about twenty and situated in small towns feel their presence necessary to the success of the meetings and their absence noticeable, while the place of meeting is naturally easily accessible. Societies of 100 members and upwards living around large towns in widely scattered homes, far distant perhaps from the society's headquarters, know that if they are indisposed, or find it inconvenient to attend, they will not individually be missed. To London, with its membership of over 1,000, this applies with increased force.

There is no disguising the fact that the attendance at the first meeting of the new session of the London Telephone Society was extremely disappointing, even when allowance is made for the manifold causes which militate against large attendances at Salisbury House. We are well aware that some members have some two hours to spare between the time of leaving the office and the opening hour of the meeting, whilst others have to journey in from Kensington, Dalston and other outlying centres; that instead of dining with their families they have the expense and discomfort of obtaining a meal elsewhere; that in the most favourable circumstances they do not get to their suburban homes until half-past nine, and, in the most unfavourable, at anything after eleven o'clock; and that, in addition, the wintry weather is often most conducive to staying indoors. In the more unfavourable cases, therefore, it doubtless requires the inducement of an exceptionally or personally interesting paper to ensure a member's presence. But it is precisely on this point that we invite the careful consideration of our readers. What constitutes an interesting paper, and how is one to be assured that a paper which one does not hear is uninteresting? One may be attracted by the subject of switchboards, another by traffic, a third by construction work, and so on; or with wider tastes one may be interested in anything technical, and eschew anything of a general or speculative nature. But we think that the member who attends only those meetings whose subjects "interest" him falls into the error of so many of the reading public. We are convinced that many readers imagine that only one class of book fiction, for instance—will interest them; or, more limited still, a certain few authors of that certain class. They do not realise, and give themselves no chance of realising by judicious experiment, what vast fields of entertainment and instruction are embraced in the books outside their narrow circle of reading. Once let them make an incursion into these domains and they will pay them frequent and delighted visits. So also, we believe, that many papers which appear to present no feature of special interest to certain minds, would be found on acquaintance to contain food for thought and matter of advantage. Mr. HARE, in his interesting and carefully developed paper (which we re-print in this issue), gives a good illustration of this point in the benefit he obtained from a paper on so unpromising a subject as "Screwdrivers."

There is another point. We are sure that no writer of a paper desires members to attend out of courtesy or compliment, and that a handful of enthusiasts form a better audience than a crowd of the uninterested, but while a writer must take the same pains with the preparation of a paper whether it is read to 50 or 500 the effect of repeated small attendances upon the production of good, laboriously prepared papers must be unfavourable. Appreciation is a good stimulus; and without it the quality of telephone papers may not unnaturally be expected to suffer.

#### HIC ET UBIQUE.

We had the pleasure of a short visit recently from Mr. G. W. Foster, assistant to the general manager of the South Western Telephone Company (Texas) and editor of the *South Western Telephone News*. In the last number of that journal he gives his impressions of his visit to Europe, saying amongst other things:

There is probably no better organised telephone system in the world than that of the National of England, an organisation resting upon merit and

faithfulness to duty, upon courtesy and mutual helpfulness, and upon the most comprehensive and widespread system of societies within the staff existing anywhere. The care given to the comfort and health of the women employees is not exceeded, if equalled, in the United States, and their loyalty to the company is said to be beyond all praise. From my point of view it is a pity that this great organisation is to be absorbed by the British Post Office Department in 1912, and become a bone of contention and a means of punishment or reward in Parliament.

#### Electrical Industries says with regard to the Inventory-taking:

For some time past, and for an indefinite time to come, the best brains on both sides of the telephone business have been and will be occupied, not in arranging for the extension of telephone facilities, not in developing the efficiency of the telephone service, not in making the advantages of the telephone known to a wider and wider public, but simply in calculating the price at which an undertaking shall be transferred from an organisation which knows its business to one which, being under the thumb of politicians, knows no business. The transfer is, in fact, becoming a more and more overwhelming business the nearer it approaches; and if it is ever completed the Post Office will have to face the hardly less arduous task of making the financial arrangements for purchase, and of finding the many millions required to bring the telephone service up to the level which it ought to occupy.

THE *Michigan State Gazette*, under the complimentary headline, "Carrying Goodlookers to Newcastle," says of our portrait of the Newcastle Operators' Society: "If this group of 73 young women typifies the kind of girls they have in the service in the old country, there ought not to be very much complaint, for a brighter and more intelligent-looking lot of young ladies it would be hard to find outside of Detroit (the chief city of Michigan)." It also suggests that for any American operator to join the Novocastrians would be carrying coals to Newcastle. We are glad to be able to return the compliment with regard to one of the photographs of prize-winning supervisors' divisions.

THE same gazette publishes a racy *Operators' Supplement*, from which you may learn where every individual operator spent her



holidays, together with the most personal and intimate remarks about each. It contains also an interesting photograph (reproduced from the *San Francisco Call*), which we borrow, showing the



Chinese girl operators in the San Francisco Chinese Exchange. The Oriental is flowery in his language even with regard to the exchange girl. She is known as "The Lily of the Air" and "The Butterfly that Talks." She knows the 800 subscribers by name, and we understand that numbers are not used.

SOMETHING like a record in telephone booking seems to have been created on the occasion of Madame Sara Bernhardt's four weeks' engagement at the London Coliseum. We learn that in one day alone the telephone exchange were unable to connect over 2,000 with the box office, although it possesses two direct lines. Four extra lines had to be joined up in all haste to accommodate the heavy traffic.

WE record in the usual manner amongst the staff notes the marriage of Miss Lilla Patrick, operator, of Farnham. We are aware that a capable and obliging operator in a small exchange has an opportunity of earning the affection and respect of her subscribers in a way that is denied to a unit in the staff of a huge exchange. Miss Patrick seems, however, to have been exceptionally efficient and popular, and even affords the *Daily Mail* evidence of a "Telephone Girl Who Never Lost Her Temper."

WE have received the following cutting from the *Dublin Lepracaun*:—

#### A TELEPHONE TRAGEDY.

A correspondent has written to a Liverpool paper of an extraordinary experience. He says he was using the telephone when the connection was cut off, and on his complaining the operator apologised. And yet he survived the shocking civility of the "Hello, girl!" A study in marvellous vitality.

In our opinion the marvellous vitality is rather that exhibited by this hoary joke.

FOLLOWING the usual journalistic practice, we do not print letters from anonymous correspondents unless their card is enclosed for the editor's satisfaction. A Glasgow correspondent, calling himself "Curious," writes asking for a more precise explanation concerning the agreement signed in a somewhat "wriggley" manner by a lady whose head protuded from the aperture of a patent bath cabinet as described on page 114 of the JOURNAL. But we are not to be inveigled into filling the staid columns of the JOURNAL with the eloquent, ornate and often unnecessary precision of the *Thousand Nights and a Night*.

## AUTOMATIC *versus* MANUAL SWITCHBOARDS.

By JOHN J. CARTY, Chief Engineer American Telephone and Telegraph Company.

(We are enabled by the courtesy of Mr. Carty to publish the full text of his contribution to the discussion on "Automatic *versus* Manual Switchboards" at the International Conference of European Telephone and Telegraph Administrations in Paris, to which we referred last month.)

MR. PRESIDENT AND GENTLEMEN,—In response to your request I shall speak upon the question under debate. I will tell of conditions in America with which I am personally familiar, and regarding which I have accumulated data covering a period of years. I do not presume to speak concerning conditions in Europe, so that I shall be obliged if you will regard what I have to say in this light. From your own expert knowledge of conditions in Europe, each of you will be able to judge how far the experience which we have obtained in America may be applicable to your own case.

The subject under discussion is sometimes stated as "The Manual Switchboard System *versus* the Automatic Switchboard System." It will be instructive to see what is meant by these two terms.

The term manual switchboard denotes a system whereby the operation of connecting two subscribers together is performed by hand, and without the employment of automatic machinery.

The term automatic switchboard, on the contrary, denotes a system whereby the two subscribers are connected together by automatic machinery and without the employment of manual labour.

I shall ask you to consider with me for a few moments these two systems.

Let us begin with the so-called manual switchboard, and make a brief analysis of its method of operation, and by so doing we shall find that it abounds in automatic features, and that in its operation automatic labour-saving machinery has been employed to an extent which is truly surprising to anyone who makes the analysis for the first time. You will find that the term manual does not correctly describe the system to which it is applied, and that the so-called manual switchboard system is partly manual and partly automatic, and you will find that the number of automatic operations which take place in making a connection form a large proportion of the total.

It would consume too much of your time if I should describe in detail each of these operations which is performed automatically, and each which is performed manually. I shall give a brief outline of them, and when once your attention has been drawn to this phase of the case you will have no difficulty in making the complete analysis at your own convenience.

The subscriber desiring to make a call first takes the telephone from its hook and places it to his ear. This is a manual act, but one which is necessary in every system. Removing the telephone automatically releases the hook which flies into contact with several springs, the result of which is to set in motion a train of automatic apparatus closing the subscriber's circuit at the sub-station, thereby automatically actuating a relay at the central office. This relay having been automatically set in operation lights a lamp before the operator, who thereupon performs a manual act, inserting the plug into the answering spring jack. This again automatically makes connections which accomplish a number of different operations, such as disconnecting the line relay, and so forth. The operator works her listening key and connects to the called-for subscriber. This causes a train of automatic operations to take place, and then the subscriber's bell is rung. He takes the telephone from the hook, and this automatically notifies the operator that he is at the telephone.

The reverse of all this takes place when the disconnection is made. The subscribers hanging the telephones on their respective hooks, thus set in motion a complex train of automatic operations, whereby the operator, without listening in upon the line or asking the subscribers if they are done talking, may determine at a glance that the conversation is finished, and by the simple operation of withdrawing the plugs and allowing them to fall automatically into their positions, mechanism is released which automatically restores the lines to their original condition.

In the handling of trunk calls—*i.e.*, calls between the "A" operator and "B" operator in the different offices—another extended series of automatic operations are intermingled with those which are performed manually. In fact, a complete analysis of all the operations involved will show that a very large proportion of them are performed automatically. Thus it will be seen that, notwithstanding what may be said by the partisans of the so-called manual system, they have, by their deeds, acknowledged that there are many advantages in automatic machinery; in fact, if we trace the evolution of the manual switchboard as exemplified in the modern common battery system, we shall find that its progress towards the present high state of efficiency is marked by the adoption of machinery to perform operations which, in the earlier systems, were done by hand.

In the old type of manual systems it was necessary for the subscriber, in order to signal the office, to turn a crank, thus operating the magneto-generator and throwing a drop at the central office. At first it was necessary for the operator to restore this drop by hand. Then a plan of automatically restoring the drop upon the insertion of the plug by the operator was adopted. Finally, the drop itself was removed and relays automatically controlled by the subscriber and bringing into play at the proper time electric lights, were substituted.

A study of the growth from the earliest systems to that at present in use shows in a very interesting way that the high efficiency now obtained from the common battery system is largely due to the adoption of automatic operations. As it will be easy for anyone to make this analysis for himself, I will not pursue it further, but enough has been said to make it clear that the so called manual

system is really one composed of both manual and automatic operations. It is partly manual and partly automatic. It is, indeed, a form of semi-automatic.

Turning now to the so-called automatic system and making but a brief analysis of its operation, we find that, properly speaking, it is not an automatic system, but only partly so, and that without the aid of human intelligence at the central office and without the employment of operators, it has not been possible to operate it on any substantial practical scale. While this is true even in a telephonic network with a single central office, the full force of the statement is not appreciated until we contemplate the so-called automatic system as being applied to a comprehensive telephone system, such as sooner or later must grow up in every country and in every city.

Let us consider the operations of the automatic system in the elementary case of a single central office. The subscriber desiring to send a call must take his telephone from the hook and perform a number of manual operations, depending upon the character of the call he wishes to send. Then he must press a button, which, if all goes well, rings the subscriber desired.

It has been found in practice, however, that this automatic machinery at the central office can be made to give service only by the aid of mechanics constantly in attendance there. The duty of these mechanics is not simply to make repairs and remove faults in the ordinary sense of the term, for they do more than this. They actually assist the machinery to work. By the most careful training some of them become exceedingly expert, so that with a supersensitive ear they are able to detect when the machinery is going wrong. They are equipped with portable telephones and transmitters, and when they have reason to suspect that the call is not going right, they listen in upon the subscriber's line, and if the machinery has gone wrong they ascertain from him the number desired, and operate the machinery by hand, so as to produce the desired connection.

The assistance which they give requires them to listen frequently to the conversation of the subscribers, and to give constant surveillance to the connections. This supervision is as varied as the character of the faults encountered.

These men, whose presence is essential to the working of the system, are, in fact, "mechanician operators." In addition to these, operators must be employed for toll and long distance work, for answering subscribers who call for numbers which have been changed, and for performing those large classes of service requiring human intelligence.

In America, wherever you go into an automatic exchange, so-called, there you will find operators employed for these various classes of service which I have mentioned, and for more which I might give in detail if time permitted. In all of these exchanges comfortable operators' quarters are to be found, together with the usual provisions of lavatories, retiring rooms, and other conveniences which are to be found in the so-called manual exchanges.

But it is not in the system in its undeveloped state employing only one central office that the manual features of the automatic system are to be most clearly discerned. In order to see how thoroughly misleading is the term automatic switchboard as applied to these systems, it is necessary to contemplate a telephone system more or less highly developed.

To do this we must consider the telephone system as a whole, taking into account all of the circumstances of the case, not simply one, or two, or three of them, but the whole multitude of factors which enter into such a complex problem.

We must give rigorous attention to a vast amount of data and requirements pertaining to the traffic upon which the design of the system is based, and we must take carefully into account all of those important commercial circumstances which have such a profound, though often unsuspected, effect in broadly shaping the results.

It is only after we have done all of these things that we are prepared to begin to design the plant of the telephone company or administration. This word plant which in the English language is applied to the structure constituting the physical property of the telephone company, is happily suggestive in connection with the point I wish to illustrate, for it brings to mind the idea of growth, and that in a problem such as ours, in order to attain successful results, we must contemplate a plant or system as it must exist at

its different stages of development. We are not building something which, as it leaves our hands to-day, is in its final form. Each day, each month, each year our plant is growing, and we must so shape it and so add to it that as this growth proceeds it will have the highest efficiency which may be expected of it at each period of time. And above all we must take care that the principles upon which this growth is planned will be such that when the system is fully developed it will be working at its highest efficiency.

Our view is not comprehensive if it is confined to the central office switchboard alone. We must always have in mind that while this is a vital part of the system it is by no means all, and that considering the telephone investment as a whole the money invested in central office switchboards is a relatively small part of the total.

In our American practice we have for years endeavored—and I may say with substantial success—to take this view of the situation. In my office there is a large sub-department devoted to the study of the question from the standpoint of subways and cables; another for buildings; another for all telephone apparatus, including central office switchboards; another and very large department working upon the traffic parts of the problem; one devoted to development studies relating to growth of population and stations and kindred subjects; and still another whose sole duty it is to make fundamental plans based upon all of these data put together and co-ordinated.

These fundamental plans being based upon all of the factors in the case provide in outline for the location and number of the underground ducts and cables, the location and size of the central offices, and the size of the central office switchboards.

It is obvious that if to serve the needs of a given locality, it is necessary at the present time to put underground a single duct, it would be a mistake to limit our construction to the immediate needs of to-day, provided, as is nearly always the case, further growth is to be expected. Some provision for the future must be made. How many ducts, therefore, we should put down in advance of the immediate needs is a very important engineering and economic problem. If but one duct is put down now, and another one is needed the following year, manifestly a waste of money will be incurred, due to removing the pavements and making a new excavation the following year. To provide for the future, therefore, by adding duct by duct and digging up the streets each time a new duct is needed, would cause a great waste of money.

On the other hand, to take an extreme case, if a sufficient number of ducts were put down to provide for the needs of 100 years in the future (even assuming we could forecast correctly for such a long period), another waste of money would take place, for the interest and other annual charges upon the construction which must remain unproductive for so many years would more than offset the saving which would be made by avoiding the repeated excavations.

We must choose, therefore, in our construction, some point between these two extremes.

In the plans which we have made for New York and for the other cities in America, it has been found, all things considered, most economical when building new subways to plan for a period somewhere between fifteen and twenty years ahead. Such considerations as these have guided us in making fundamental plans for New York City, which so far as buildings and subways are concerned, are intended to form a general guide for our construction work which is to take place each year for the next twenty years. These plans are not speculative or paper plans, but we express our confidence in them by following them in the construction which we do each year, putting down not only that which is needed for to-day, but that which after most careful studies, represents our best judgment of what will be required during a period of twenty years.

It should not be understood, however, that we can forecast with precision the requirements for so long a period ahead, but we have worked with these fundamental plans now for so many years that we know that they form a trustworthy guide, provided that they are continually kept under review and modified each year as the exigencies of growth demand.

If it would not take me too far away from the subject under debate, I could show to you in many interesting ways the vast sums

of money which we have saved because of these fundamental plans and how absolutely essential they are in enabling us to expend most economically the enormous sums of money which we annually put into our plant. For example, our expenditure for new construction during the first six months of 1910 is more than \$21,000,000.

With such plans before us for a given city, we are able to study the probable conditions of the plant at each period of its growth, and with such a guide we are deterred from installing a switchboard or other system, however suitable it might seem to be at the moment, that would not be capable of growing into that form and to that magnitude which would be required of it by the conditions which it must encounter before its life has expired.

Some idea of these conditions at New York, so far as they are affected by magnitude, may be obtained from the following data:—The fundamental plans for that city, not including the vast suburban region outside of the municipal limits of Greater New York, provided in 1900 for a system of 51,398 telephone stations, served from 43 central offices, the population of the city being 3,437,000. In 1910 the plans provide for 376,000 stations, served from 52 central offices, with an estimated population of 4,800,000. In 1930 the plans provide for 2,142,000 stations to be served from 109 central offices, with an estimated population of 8,800,000.

Without any commentary whatever these figures at once put us on our guard against the grave danger of assuming, even if the so-called automatic system was suitable for a small number of subscribers, that it would be a proper thing to employ in New York or any other city where it is expected that a proper development of the telephone will take place. This feeling of caution is strengthened when we consider that in the neighbourhood of New York City there is a vast suburban region intimately connected with it telephonically, and served by a very great number of central offices connected by a plexus of trunk lines. But there is more than this which we must take into account when we are studying this automatic system as applied to America. It is the grand ideal of Mr. Theodore N. Vail, the founder of the telephone enterprise in America, and still its active head, that we shall provide universal service. That is, that each person, firm or company in the United States that ought to have a telephone shall be provided with one, and that any person so provided wherever he may be located, can within a reasonable time be connected to the telephone of any other subscriber and talk satisfactorily.

This is not a mere dream. We have done solid continuous work upon it for more than 30 years, and now with rapid strides it is proceeding to fulfilment. At the present time an enormous amount of toll line business takes place between New York City and the territory tributary to it for 30 miles around. In 90 per cent. of this business the connection is made in an average of 38 seconds, and in the remaining 10 per cent. the average is about 80 seconds. In all of these cases the transmission conditions are so planned that the subscriber may converse with ease. A local call is accomplished in less time, requiring only 22 seconds where but one office is involved, and slightly more between two offices.

These figures which I have given include the elapsed time from the receipt at the central office of the subscriber's signal on the lamp until he is connected with and is talking to the called-for subscriber. But to establish a universal service requires working over much greater distances than this.

*(To be concluded.)*

#### OPENING OF THE GLASGOW POST OFFICE CENTRAL EXCHANGE.

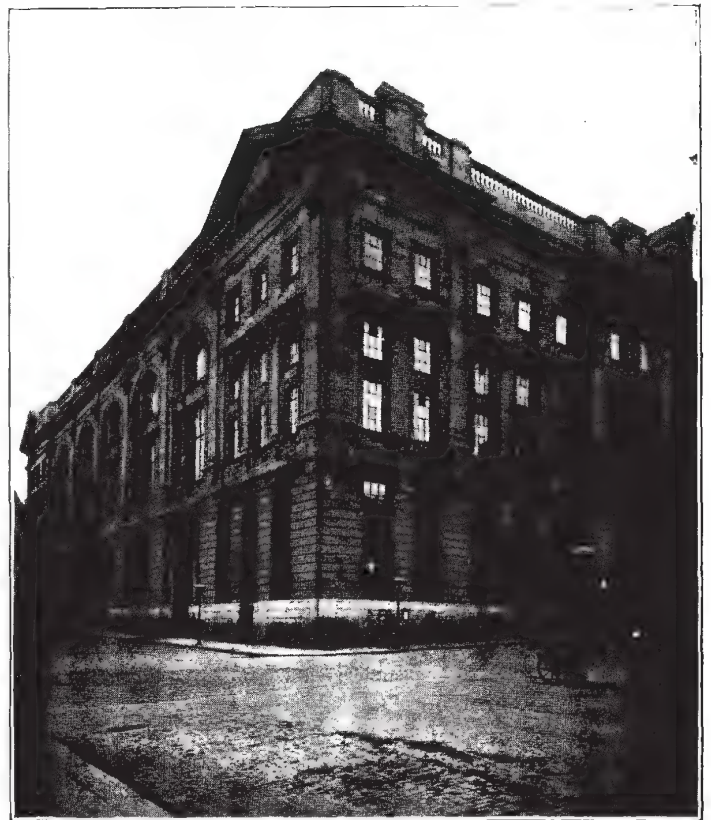
THE opening of the Central Exchange in Glasgow by the Post Office is an instalment of a general scheme agreed to by the Post Office and the Company for the proper telephoning of the city. The Company has already built premises at Hillhead and opened an exchange with a capacity of 10,000 lines, and is further engaged in the erection of a building in the centre of the city, north of the new Central Exchange, to be called the Douglas Exchange, which will give accommodation for 7,000 lines. The Post Office on its part is erecting new exchanges in the east end of the city, which will be called Bell and Bridgeton, and the subscribers' and junction lines, both Post Office and National, will be transferred from the existing four exchanges covering the same area. As soon as these

are completed the whole of central Glasgow on the north side of the Clyde will be supplied with up-to-date equipment.

The Central Exchange was successfully opened, as already recorded in the JOURNAL, on Aug. 13 with about 5,000 working lines, and it is anticipated that on Jan. 1 next the Company's lines at present joined to the Royal Exchange and situate in the central area will be transferred to that exchange. The underground work in connection with this is at present proceeding, and the apparatus in the Central Exchange is ready.

An interesting inspection of the Central Exchange took place on Sept. 19, and by the courtesy of the Post Office the Company's local directors and chief officials were present. Previous to the inspection, lunch was provided by the Peel-Conner Telephone Works, Limited, the manufacturers of the switchboard, and a representative body of gentlemen from this and other countries was present. Mr. Hirst, the chairman of that company, in proposing the toast, "The Engineers of the Post Office," read a letter from the Postmaster-General expressing regret at his enforced absence, and Mr. Hirst then proceeded to emphasise the fact that the installation had been manufactured entirely in this country.

The new switchroom is housed in a portion of the new Parcels Post Office building, in Waterloo Street, the entire second flat being used for switchroom, apparatus room, operators' dining-room etc. There are 28 equipped local sections and twelve equipped junction sections, and these are formed in the ordinary horseshoe



*[By permission of the POST OFFICE ELECTRICAL ENGINEERS JOURNAL.]*

fashion. The room is a spacious one, and the service given is of a very satisfactory character.

After the inspection of the Central Exchange, the company visited the trunk exchange at the General Post Office, in George Square, and the system of working the trunk lines was fully explained by a number of the Post Office officials. Subsequently the Postmaster and Surveyor for the Glasgow district entertained the company to afternoon tea in his private room. The trunk exchange, which is a comparatively new one, is housed in a most compact room, specially built for the purpose, and is one of the largest trunk exchanges in the country.



### OPENING OF NEW TELEPHONE EXCHANGE AT PARK STREET, CARDIFF.

In the absence of the Lord Mayor (Alderman John Chappell), who was detained in North Wales, Mr. H. Fedden, Bristol, chairman of the local board of directors, welcomed the guests,



and formally declared the exchange open. Mr. S. J. Goddard, General Superintendent, and Mr. R. A. Dalzell, Provincial Superintendent, both wired their inability to attend. The other local

Electrician, R. Williamson (Manager at Newport) and J. D. Duncan (Contract Manager).

The new exchange, which is leased by the Company from the Post Office, is situated in part of the Head Post Office building, which was enlarged for the purpose. The equipment was installed by the British Insulated & Helsby Cables, Limited, and is of central battery type.

The present equipment is designed for 4,200 lines, and with an ultimate capacity for 10,000 lines. The subscribers' lines formerly served by the New Street, Roath, Canton, and Cathays Exchanges now terminate in the Park Street Exchange.

### LONDON NOTES.

CONGRATULATIONS to Mr. F. J. Bunce, Chief Clerk, Southern Contract Office; Mr. W. G. Claxton, Clerk, Statistical Office; and Mr. A. L. Howse, Clerk, Wages Office, all of whom have been recently married. Presentations were in each case made, and good wishes expressed by their colleagues.

THE number of entries amongst the staff for technical classes at the various London institutes is 369, being 22 more than last year. This increase, although slight, is gratifying as evidence of greater keenness and interest in technical knowledge. It is to be hoped that none of the entrants will allow that interest to flag throughout the session.

IN the City and Guilds Examinations for 1909-10 Mr. G. Smith, Maintenance Department, Gerrard, obtained first-class honours in telephony, and Mr. T. M. Inman, Exchange Electrician, Battersea, first-class honours in telegraphy. Mr. W. A. K. Ward, Apprentice, in addition to second class honours, also obtained a bronze medal in first-class ordinary telephony. Fourteen other members of the London staff secured second-class honours. The results are certainly encouraging, but a much larger honours list is possible, and will doubtless be forthcoming next year.

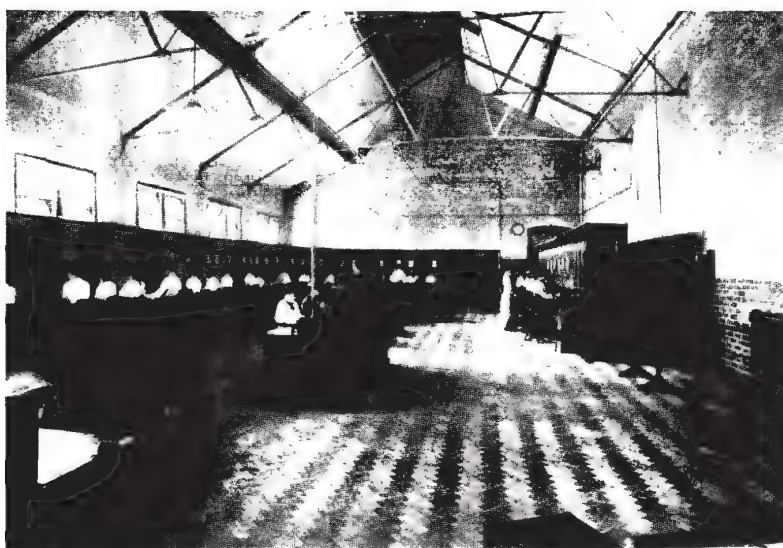
MR. HARE'S presidential address to the London Telephone Society on Oct. 3 abounded in lucid and cogent reasoning, illustrated with a wealth of quotation and aphorism, and all bearing the unmistakable literary flavour which comes from wide and observant reading. The subject, "Papers: Their Writers and Audiences," was one peculiarly adapted for an opening meeting, and afforded a medium for much excellent advice, not only as to what to do, and how to do it, but also what is quite as important—the things to avoid and guard against. Mr. Hare's analysis of papers into three classes—(a) descriptive; (b) deductive; (c) debateable—seemed very comprehensive; but there were naturally differences of opinion as to which of the three would be most beneficial to a general audience. With nearly all of Mr. Hare's reasoning and conclusions his hearers were in perfect agreement, but this unanimity unfortunately tended to shorten the subsequent discussion. Mr. Gill's remarks as to the benefits of full and unrestrained discussion at all the society's meetings were to the point, and it is to be hoped that more of the younger members particularly will come prepared to say something.

THE Operators' Society started well on Oct. 10, 236 members being present to hear Mr. Corner, Assistant Traffic Manager, open the session with a paper on "Our Ideals." Mr. Corner has the knack of making himself interesting on any subject, and if, as he himself admitted, he had nothing new to tell us, he nevertheless told us some of the old things in an original way. Certainly he was chafed a little later over his numerous literary allusions and quotations, but succeeded in turning the tables very neatly on his critic. The discussion was a little disappointing, because so few of the speakers gave their personal experience on the outstanding practical points dealt with in the paper. The question as to whether operating is monotonous work arose incidentally; the subject is one on which a very piquant debate might well be anticipated, and the committee would do well to bear it in mind for a future meeting. The membership of the society is now over 500.

IN addition to the list of staff given in last month's JOURNAL, the Inventory work is also causing London to lose temporarily the services of Mr. H. Davis, Metropolitan Stores Manager. Mr. Davis has been appointed to act as District Manager at Cardiff during Mr. Waite's absence, and he carries with him to Wales the good wishes of his Metropolitan colleagues, who will all miss his genial and cheery presence.

THE next meeting of the London Telephone Society will be on Nov. 9, when a paper on "Inside Engineering" will be read. The paper will probably deal with several contentious points, regarding which there is considerable difference of opinion. A wide field for friendly discussion is therefore likely to be thrown open, and this ought to insure a large attendance, particularly of those interested in our engineering problems. The Operators' Society meets on Nov. 16, when two papers, one by Miss E. Godden on "Exchange Catering," and the other by Mr. J. Webb on "Distribution," will be read.

THE local committee of the Staff Transfer Association held its first meeting after the holidays on Oct. 12. There was a full agenda, the principal subjects under discussion being dismissals of staff; the position, after the transfer, of



directors present were Messrs. Richard Cory, T. Pole, and F. H. Glynn Price, whilst the leading officials in attendance were Messrs. B. Waite (District Manager), J. James (District Engineer), W. J. Marsh (Traffic Manager), S. F. Whetton (Chief

fault clerks and of members of the staff who have gone through the apprenticeship course; and the recent formation of a joint board with the A.S.T.E.

MISS J. McMILLAN, of the Correspondence Department, Salisbury House, has been achieving honours at the annual Business Exhibition at Olympia. In the commercial letter-writing competition, six ladies and seventeen gentlemen entered; Miss McMillan obtained first place, receiving as her reward a gold medal and a purse containing two and a half guineas.

### GLASGOW NOTES.

*The Telephone Society.*—The opening meeting for the session was held in the Technical College on the evening of Wednesday, Oct. 12, when there was a good turnout of members. A most interesting lecture, illustrated by many slides and diagrams, was delivered by Professor Magnus Maclean, his subject being "Kelvin: Investigations and Apparatus for Electric Signalling."

The lecturer for a considerable period was associated with Lord Kelvin in some of his investigations, and while this personal aspect was not directly touched upon in the lecture, its influence was apparent. Professor Maclean dealt at some length with the laying of the Atlantic cables and with Lord Kelvin's services in this connection. The story is a fascinating one, and it was to a very attentive audience that the lecturer described the various difficulties which had to be surmounted, the many disappointments which had to be endured, and the successive failures which had to be accounted for. Through it all, however, Lord Kelvin's dominant optimism prevailed, and the satisfactory completion of the undertaking may be taken as a tribute to his characteristic courage and resource.

The circumstances which called forth the syphon recorder were dealt with and the actual mirror galvanometer used by Lord Kelvin on board the *Agamemnon* was laid on the lecture table for inspection.

Professor Maclean also touched interestingly upon Kelvin's interest in the introduction and on the development of the telephone, and read a report submitted by him on Graham Bell's first instrument at the time of its introduction in America.

*The National Telephone Operators' Society and Club.*—The first meeting of the session was held in the Masonic Hall, West Regent Street, on Monday evening, Oct. 10, when the proceedings were opened with the reading of a most interesting paper on "Early Telephony," written by Dr. Alexander Graham Bell, the inventor of the telephone. Mr. Rodger read the paper which dealt with many events in Dr. Bell's life and the experiments leading up to one of the greatest and most useful inventions of the age. The paper was very much appreciated by the audience. The club part of the programme, consisting of music and song interspersed with dances, was entered into with much zest and concluded an evening greatly enjoyed by all.

FURTHER additions to the ranks of benedicks! On the evening of Thursday, Oct. 6, Mr. J. W. Macdonald, Cashier, was the recipient of a handsome case of cutlery with the staff's hearty congratulations on the occasion of his marriage to Miss Janet Drennan, Clerk in Charge of Bridgeton Exchange. The presentation was made by Mr. Valentine, who claimed to be expert at tasks of this kind as a result of the extent and variety of the experience afforded him. He bore tribute to the good work done by Mr. Macdonald in various positions of responsibility and wished for him and for Miss Drennan a long life of wedded happiness. As a token of their appreciation and good wishes the chief officers of the Traffic Department and the operators in the Bridgeton Exchange respectively presented Miss Drennan with a silver tea service and a cake basket.

It having become known that Mr. R. P. Buckeridge, Cost Clerk, Engineer's Department, also intended to take unto himself a wife, the staff met in the Engineer's Office on the evening of Tuesday, Oct. 18. Mr. Thyne presided and after presenting a suitable gift to Mr. Buckeridge as a token of the esteem and good comradeship of the staff, he wished for Mr. and Mrs. Buckeridge a long and happy married life. Mr. Buckeridge suitably replied.

MR. J. W. BENNET, Contract Officer, Glasgow, has been transferred to a similar position in Hamilton and his transfer was made the occasion for a presentation by his colleagues in the Contract Department as a token of the esteem in which he is held by his fellow-workers.

*Bell Golf Club.*—The final of the monthly medal competition was held at Carntyne on Saturday, Oct. 1, when the prize winners were:

1. W. Lang .. .. .	88	-	2	=	85
2. H. Thomson .. .. .	102	-	14	=	88
3. R. Brough .. .. .	101	-	10	=	91
4. D. B. Heberton .. .. .	95	-	4	=	91

### CORRESPONDENCE.

#### "THE TELEPHONE LOAD LINE."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

(1) As the paper by Mr. Deane on the above subject which appeared in the June, July and August issues of the JOURNAL must have proved of considerable interest to all engaged on traffic work, it is thought that the following notes may be of use:—

(2) *Page 47, par. 1.*—As Mr. Deane points out, where the fluctuations in traffic are small the average is the best figure to work on. Where the fluctuations are considerable, however, the mere fact that holidays are taken as far as possible while the traffic is slack makes it wrong to assume that slack times and busy times balance each other as regards their effect on loads and service.

(3) A better scheme is to take the peg count on a fixed day, say, the 10th of the month, or the nearest working day if the 10th is a Saturday, a Sunday or an abnormal day. In order to allow for the fact that some of these peg counts would occur during holiday seasons, when the conditions cannot be regarded as normal, it would probably be advisable not to include the figures obtained during, say, three slack months when considering such questions as calling rates and loads. This, of course, involves a greater number of peg counts, but the increased usefulness, as regards staffing and future design, would justify the additional trouble.

(4) *Page 47, col. 2, par. 3.*—Should the aim be to credit the "A" and "B" operators with the operating they do? This does not seem to be the best plan; for example, a "B" operator failing to ring on her connections would get "credit" for requests to ring again or to change junction. In the case of "A" operating there does not seem to be any easy way of recording "supervision." The best plan is to look upon the peg count as an uncontroversial count of unit calls to be taken as simply as possible, and in such a way as to be, as far as possible, independent of the personality of the operators.

(5) *Table B, page 48.*—"Seconds" has been printed in error after the third column of figures, and it may not be clear that this column shows the ratio between the figures in the first and second columns.

(6) *Table C, page 71.*—The junction valuations are for average London conditions, and cannot, of course, be adopted by other districts without due discrimination. This table has already been discussed in the September and October issues of the JOURNAL; a further point is that a small London exchange having 25 outgoing junctions would have small groups of junctions and comparatively little order wire working, while an appreciable amount of traffic would pass through one or two intermediate exchanges, accounting for the apparently high average junction valuation of 2.0. In a provincial town with few exchanges, however, a similar exchange might have a considerable proportion of order wire working and little through working, giving a value of, say, 1.5.

(7) *Page 72, par. 1.*—There is a reference to the disadvantageous effect of a high percentage of junction working on the load that can be taken at an exchange. It is possible to over-estimate the importance of this. A single operator having 100 per cent. local working and a single operator having 100 per cent. outgoing junction working, loaded according to the correct time values, are equally likely to have a given number of accumulated calls. The chief difference lies in the fact that there is more worry in the latter case, due to the accumulated calls waiting, say, 50 per cent. longer for an answer and taking 50 per cent. more time to be operated. When there are a number of operators, however, there is team work, and the better the team work the less is the number of accumulated calls, so that the above point tends to be negligible when the supervisors and operators are keen on the correct principles of team work. In the case of a London exchange having 80 per cent. junction working at a junction value = 1.6, busy hour load = 220, speed of answer during the busy hour = 5 secs., the average number of calling signals waiting to be answered, during the busy hour, works out to 1 per 4.8 positions (unvalued calls  $\times$  5 secs.  $\div$  aver. no. of call sigs.  $\div$  3,600 secs.). This figure suggests that the worry due to accumulated calls should be negligible with sound team work.

(8) *Page 72, Table D.*—It is thought that these loads are local standards only. The figures suggest that the normal magneto load has been adopted for central battery exchanges, and the magneto exchange figures reduced to a certain fraction of the C.B. load. This seems to be inverting the natural order of things, but it is understood that the figures have since been provisionally modified to—

Type of switchboard.	Busy hour load expressed in local calls.
C.B. .. .. .	220
Magneto (self-restoring) .. .. .	200
Magneto (hand-restoring) .. .. .	180

(9) *Page 72, Table E.*—The time taken by the "A" operator to pass the number and the slight pause before the assignment of the junction seem to be a legitimate part of the time value of an incoming O.W. call. This time, although small (say, 1 sec.), is an appreciable fraction of the total time per call, but is not given in Mr. Deane's figures.

(10) *Page 73, col. 2.*—It is stated that the "B" operator is often forced to demand a repetition of the "A" operator's application. This cannot apply to any appreciable extent as the standard instruction is for an O.W. "B" operator to remain silent in such cases.

(11) *Page 73, Curve No. 2.*—The method given suffers from the disadvantage that it is not easy to travel from one curve to the other quickly and accurately. The following quick cut suggests itself:—

From the lower curve:	
Calls per position per half hour .. .. .	16.5
Positions per operator .. .. .	3.45
Total "A" positions .. .. .	110
$\therefore$ no. of "A" operators = $\frac{110}{3.45}$	= 32

(12) It follows that curve No. 5, suitably modified as regards scales, is the most convenient form. For example, let the vertical scale read "0...90, 100," "valued calls per half-hour per position" (or 0...110, etc., according to load) and the horizontal scale read "0, 0.1, 0.2...1.0" "operator per position." Then if calls per position per half-hour = 16.5, 0.305 operator per position is required.

$\therefore$  no. of "A" operators =  $110 \times 0.305$  = 33.6.

The discrepancy between 33.6 and 32 seems to be due to the curves Nos. 2 and 5 not being drawn so as to be quite identical.

(13) This modified form of the curve lends itself to plotting a curve to show "operators required for given traffic" in any particular exchange, e.g., working on curve No. 5:—

A load of 60 calls per position per half-hour corresponds to 0.7 operator per position. Then for an exchange having 90 working positions,  $90 \times 0.7$  = 5.400 calls correspond to 90  $\times$  0.7 = 63 operators.

(14) Page 73, Curve No. 3.—This curve is an average curve, and is not considered sufficiently good as a basis for fixing operators' duties in particular cases. The allowance to be made depends upon the proportion of straight and split order wire positions and ringing positions.

The points to be considered are—

- (a) The only loss of efficiency, when a "B" operator handles several straight order wires serving one exchange, is that due to the application of table F, page 73.
- (b) Loss due to the increase in split order wire working when positions are taken over.

The most scientific plan seems to be to consider each exchange in detail, working on standard loads for the various types of positions, but allowing for the loss of efficiency in the case of split order wire positions, etc., when more than one position is being covered by any operator.

(15) Page 91, Table G.—The use of "A" operators' day loads for staffing purposes, except as a rough guide, does not seem justifiable, because of the differences in the conditions at various exchanges caused by the shape of the load line and by the efficiency with which the operators' duties can be arranged to meet the traffic. The theoretical day load figures for London Wall and Holborn show a 4 per cent. difference owing to difference in shape of load line. The cost of one unnecessary additional operator would far outweigh the value of the time saved in using an average figure in such cases.

(16) The same argument applies to the principle of making divisions self-supporting, page 91, col. 2, because the convenience of this arrangement is generally obtained at the expense of an increase in operators. For example, three operators might be required from 8 to 8.30 a.m., but one for each division, say 6, are employed. This excess of staff in the morning will probably cause more difficulty in staffing for the latter part of the day, and additional staff may have to be employed in order to make up for this, and to have six operators on duty at 7.30 to 8 p.m., when, say, only four are required.

It seems feasible to have a duty sheet with the operators' names arranged in position number order, and with the duties in a methodical order. For example, the effect on the arrangement of the operators at the switchboard during one week would be:—

Pos. No., 2, 4, 6, 8, 10, 12, 14, 16, 18....  
Duty, B, D, A, C, B, E, A, C, B....

It will be seen that, independently of the periodic changes in duty, the operators would automatically spread out on coming on duty, while any stretch of nine or ten positions will be practically "self-supporting." Any slight irregularities in staffing that may arise should be met by the supervisors, acting on the motto "co-operation" rather than "competition," arranging their staff to help adjacent divisions, and temporarily lending operators when necessary, with a view to obtaining the best results in the exchange as a whole.

London, Oct. 27, 1910.

CHAS. H. TOMS.

#### METHOD OF LOCATING AND REPAIRING FAULTS IN UNDERGROUND CABLES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I FEEL sure that a description given in the JOURNAL by anyone who has had faults in underground cables as to how such faults were located and repaired, and what temporary measures were taken to keep up communication whilst the cable was being repaired, would be most interesting. To myself, who have only just had an underground system put down, and have got my first trouble to come (and may it be long in coming), such a description would be most useful.

G. GILLMORE, District Manager.

Douglas, I.O.M., Oct. 17.

#### BRASS NUMBER SOCKETS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ANY of my *colleagues* who are still using brass number sockets may be interested in the following two tools, which have been found useful in overcoming, to a certain extent, two of the difficulties experienced with these sockets.

Fig. 1 shows a tool for extracting sockets (made from an old bradawl), the point being of sufficient length to reach behind the socket but not long enough to project beyond the barrel of the jack, and being turned down, leaves a small



FIG. 1.

head as shown. The tool, of course, is put through the disc, and the head engages with the opposite end of the socket, enabling it to be readily withdrawn without damage.



FIG. 2.

Fig. 2 shows a small brass pin fitted on the socket box. It is of such a size that a socket pressed on to it has its sides slightly opened, thus giving a better grip in the jack.

Sheffield, Oct. 3.

S. R. V.

#### THE TELEPHONE SOCIETY PAPERS' COMPETITION SESSION, 1909-1910.

THE following are the awards made by the Education Committee in respect of this competition:—

##### CLASS I.—OFFICE (including Contract Work).

- 1st premium (£7) to J. F. Scott, Cashier, Glasgow, for paper entitled "The Psychology of the Office."
- 2nd premium (£3) to J. M. Anderson, Chief Clerk, Glasgow, for paper entitled "Capital and Revenue."

##### CLASS II.—OUTSIDE PLANT.

- 1st premium (£7) to H. A. Smith, Engineers' Department, Salisbury House, for paper entitled "Elementary Engineering Economics."
- 2nd premium (£3) to H. Green, Engineer-in-Chief's Department, Head Office, for paper entitled "The Design of Dry Core Telephone Cables."

##### CLASS III.—INSIDE PLANT.

- 1st premium (£7) to Thos. Pettigrew, Assist. Electrician, Glasgow, for paper entitled "Iron."
- 2nd premium (£3) to G. H. Bryant, Exch. Electrician, Salisbury House, for paper entitled "The Telephone Exchanges of London."

##### CLASS IV.—TRAFFIC.

- 1st premium (£7) to H. F. E. Deane, Traffic Dept., Salisbury House, for paper entitled "The Telephone Load Line."
- 2nd premium (£3) to A. E. Coombs, Traffic Manager, Bristol, for paper entitled "The Bristol Exchange Daily Originating Traffic."

##### CLASS V.—GENERAL.

- 1st premium (£7) to A. K. Murray, Contract Manager, Hull, for paper entitled "Success."
- 2nd premium (£3) to F. W. Roberts, Local Manager, Brighton, for paper entitled "Telephone Development."

#### INVENTORY OF PLANT.

THE following alterations and additions have been made to the list given in the October JOURNAL:—

##### Additions—

HEADQUARTERS.			
Boyd, J. H. H., Stores Clerk, Glasgow .. ..	..	..	Headquarters.
Hanchett, E., Wages Clerk, Salis. House .. ..	..	..	"
Skinner, K. A., Cost Clerk, Swansea .. ..	..	..	"
CLERKS.			
Dalziel, J. C., Clerk, Kilmarnock .. ..	..	..	Reading.
Kennedy, J. W. M., Clerk, Glasgow .. ..	..	..	"
Kirkwood, R. F., Clerk, Glasgow Buildings Dep. ..	..	..	Bristol.
DRAUGHTSMEN.			
Hill, F., Draughtsman, H.O. .. ..	..	..	Plymouth.
ENUMERATORS.			
Harvey, T., Foreman, Glasgow .. ..	..	..	Reading.
Jones, J. C., Chief Inspector, Chester .. ..	..	..	Wolverhampton.
Phillips, T. F., Head Office .. ..	..	..	"
Stelling, J. W., Local Manager, Halifax .. ..	..	..	Halifax.
Talbot, H. J., Assist. Eng., Streatham .. ..	..	..	Bristol.
Winstanley, I. H., Switchboard Staff, Head Office ..	..	..	Reading.

The following names should be deleted from the list:—

##### DRAUGHTSMEN.

Hunt, L. W., Chief Inspector, Ipswich.

##### ENUMERATORS.

Bruce, R., Asst. Eng., Belfast.  
Coles, W. H., Linesman Insp., Chippenham.  
Turner, C. H., Foreman, Birmingham.

Mr. R. B. Rae should have been described as Assistant Engineer and not as Engineer's Clerk.

#### WIRELESS TELEGRAPH SLIDE RULE.

WE have received from "The Electrician" Publishing Company a cardboard slide-rule (price 2s. 6d. nett) specially designed for calculations in connection with wireless telegraphy. By means of it, given any capacity and inductance, the corresponding wave length and frequency can be at once obtained, or conversely given the case where a certain wave length or frequency is desired, we can find the values of capacity and inductance which will give this. The wave lengths are in both feet and metres. On the back of the rule are printed certain useful data connected with wireless telegraphy, and instructions as to the use of the rule. Two scales on it correspond to the C and D scales of the ordinary slide-rule, so that it can also be used for general purposes. The rule should be useful to those who have frequent occasion to make calculation of wave length, or for similar purposes.



### THE TELEPHONE MASONIC LODGE.

THE regular meeting of this lodge took place at the Masonic Temple, Gaiety Restaurant, Strand, on Oct. 15, when W. Bro. Stanley J. Goddard occupied the chair. He was supported by the full complement of his officers, as follows:—W. Bro. P. P. Kipping, I.P.M.; Bros. F. A. B. Lord, S.W.; P. J. T. Kenney, S.W.; C. E. Tattersall, Treasurer; W. Bro. F. O. Harke, I.R., Secretary; Bros. A. F. Paddon, S.D.; Wm. France, J.D.; W. Bro. C. E. Wetton, P.S.G.D., Mdx., D.C.; Bros. W. J. Downes, A.D.C.; F. E. Sims; W. Bro. R. H. R. Kenway and Bro. J. R. B. Gall, Stewards, and Bro. V. Baldwin, Orgst. Mr. Matthew F. G. Boddington, of the Engineer-in-Chief's Office, G.P.O., and Mr. George E. Pingree, managing director of the Western Electric Company, were duly initiated. Some 70 brethren afterwards dined together under the presidency of the Worshipful Master, and amongst the visitors were W. Bro. J. Morrison McLeod, P.G. Swd. Br., Secretary R.M. Inst. for Boys, J. S. Collett (Colombo), E. A. Fisher, E. Petley, T. Driscoll, and Bros. Alexr. Knox (Sydney), H. Davis and S. Maber.

The recently formed "Telephone Lodge of Instruction" is now affiliated with the Emulation Lodge of Improvements, and the session was formally opened on Sept. 6, when upwards of 40 brethren assembled to hear W. Bro. R. Clay Sudlow, P.G.D., President of the Committee of the Emulation Lodge of Improvements, rehearse the installation ceremony. This Lodge of Instruction now meets at the Mansion House Station Restaurant every Tuesday evening at 6 p.m. W. Bro. Edgar W. Wainwright has been appointed Preceptor.

MR. E. A. LAIDLAW, of the Engineer-in-Chief's staff, London, has resigned his position with the Company to take charge of the telephone department of Messrs. Siemens Bros. & Company, Limited, at Woolwich, the resignation taking effect at the end of October. Mr. Laidlaw was apprenticed to the Western Counties and South Wales Telephone Company, Limited, in 1880, at Bournemouth, of which district he was made Chief Inspector in 1893. Subsequently he filled the following positions:—Chief Inspector, Plymouth, 1895, and Chief Inspector, Bristol, 1896, where he supervised the installation of the



E. A. LAIDLAW.

first C.B. exchange in Europe. In 1900 he was placed in charge of the construction of C.B. exchanges at Hull and Sunderland. He was transferred to the Engineer-in-Chief's staff in 1901, and then took charge of extensive reconstruction work at the Royal Exchange, Glasgow, and the Central Exchange, Manchester. Since 1904 he has been stationed at Head Office, where he has filled the position of Second-in-Charge of the Exchange Equipment Department. Mr. Laidlaw's genial qualities have gained for him a very large number of friends on the Company's staff, whose good wishes he will carry with him into his new field of activities.

### POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

The following paper read before the above institution is now on sale at the price mentioned:—

"The Law of Contacts." D. H. Stroud, LL.B. .. 6d.

Application for copies should be made with remittance to the Engineer-in-Chief, Head Office.

### EXAMINATION SUCCESSES.

**Head Office.**—Arthur J. French, General Superintendent's Office, Stores Department, first class (ordinary), second class (honours), City and Guilds Institute.

**Exeter.**—Engineer W. Sim recently obtained the following certificates (City and Guilds):—Telephony (ordinary), second-class certificate, (honours) second-class certificate.

**Sheffield.**—Board of Education examinations: A. Broomhead, B. Glenn, and J. W. Wright, first class, mathematics, practical (stage I). F. Webster, second class, mathematics, pure (stage I).

**Hanley.**—F. Greswell, second class, mathematics (stage II). J. Frost, first class, building construction (stage I); second class, mathematics (stage II, honours); second class, telephony (City and Guilds); first class, applied mechanics (stage I). F. C. Butterworth, second class, advanced electricity and magnetism (stage II). W. D. Edwards, second class, ordinary telephony (City and Guilds).

**Darlington.**—Inspector W. Wilson was successful in obtaining a second class in the honours grade, telephony, in the recent City and Guilds Institute examination. F. G. Body, Clerk, obtained second-class certificates in magnetism and electricity, elementary and mathematics (stage I).

### NEWS OF THE STAFF.

MR. H. DAVIS, Metropolitan Stores Manager, has been appointed to act as District Manager at Cardiff during Mr. Waite's absence on the Inventory staff.

MR. F. BARR, Local Manager, Sheffield, on his appointment as one of the sectional chiefs of the Inventory staff, was presented by the District Manager (Mr. R. C. Bennett) with a gold watch on behalf of the staff and as an expression of the appreciation felt by the whole of the district of the genial and kindly manner in which he had carried out his arduous and responsible duties in the past.

MR. A. PODMORE, Sub-Engineer, Sheffield, was presented with a pair of gold cuff links, subscribed for by the members of the staff, on the occasion of his transfer to the Inventory staff.

MR. S. O. ALLEN was, on the occasion of his leaving the district to take up his duties as Traffic Manager, Southampton, presented by Mr. E. Williamson, District Manager, on behalf of the members of the Birmingham traffic staff, with an oak *secretaire*. Mr. Williamson referred to the good work he had done as Exchange Manager at the Central Exchange during the period of three years he had been in charge. Several speeches were also made by members of the staff, who expressed their regret at his leaving, and good wishes for his future success and prosperity. Mr. S. O. Allen entered the service in June, 1899, and has served in Bath, Gloucester and Bristol. Previously to being transferred to Birmingham in November, 1907, as Exchange Manager, Central Exchange, he was Exchange Manager at Bristol Exchange. His many friends will wish him every success in his new sphere of activity.

MR. W. J. MOORE, Assistant Engineer, Bournemouth, has, during the absence of the Local Manager (Mr. E. Harper) on the Inventory staff, been promoted to Acting Local Manager; and Mr. A. J. FAITHFULL, Engineer, Winchester, has been transferred to Bournemouth as Assistant Engineer.

MISS BESSIE C. YOUNG, on leaving the Company's service to take up another position, was presented by her colleagues on the correspondence staff, General Superintendent's Office, with a gold bangle, and by the engineering staff with a pendant and chain of gold set with pearls, olivines, and a ruby. Miss Young, who has been ten years with the Company, has our best wishes for the future.

MISS AGNES MOIR, Senior Operator, Charing Exchange, Glasgow, has been transferred to Bearsden Exchange as Operator-in-Charge.

MISS ROSETTA ISAACS, Supervisor, Hillhead Exchange, Glasgow, was, on being transferred to be Senior Supervisor, Argyle Exchange, Glasgow, presented with a pendant by the staff in the former exchange.

MISS JEANIE DRANNAN, Chief Operator, Langside Exchange, Glasgow, has been promoted to be Clerk-in-Charge in the same exchange.

MISS MARGARET HAVILAND, Operator, Royal Exchange, Glasgow, has been promoted to be a Supervisor in the same Exchange.

MISS ISABELLA SPRENGER, Operator, Royal Exchange, Glasgow, has been transferred to Hamilton, in place of Miss FELICIA McLACHLAN, who has been transferred to Royal Exchange, Glasgow.

MISS ISOBEL PORTER, Operator, Douglas Exchange, Glasgow, left on Oct. 20 to go to Australia. She was presented with a pendant and chain by the staff in her exchange.

MISS ANNIE E. L. WOOD has been promoted from Clerk-in-Charge, Dewsbury, to be Travelling Supervisor, Leeds. She was presented with a dressing case by the Dewsbury staff.

MISS HILDA MARY WARD has been promoted from Operator-in-Charge, Batley Exchange, to Clerk-in-Charge at Dewsbury.

MISS A. KITSON has been promoted from Operator, Batley Exchange, to be Operator-in-Charge.

MISS ELSIE FISHER, Chief Clerk, Contract Department, Birmingham, left the Company's service on Oct. 8. She was presented with a roll-top oak writing desk and stylo, pen, on behalf of the staff, by Mr. Maclure, the Contract Manager, who conveyed to her the feelings of himself and the staff in wishing her every success in the new sphere of life she was about to enter. Miss Fisher, in replying, expressed her great appreciation.

Misses LILY READ and IDA MARION AMBLER were each presented with silver purses on the occasion of their transfer from Ashton under-Lyne to St. Anne's-on-Sea and Bradford, Yorkshire, respectively. The presentation was made on behalf of the staff by Miss Driver, the Clerk-in-Charge.

Mr. JAMES OGDEN, Foreman, Ashton-under-Lyne, was presented with a handsome pipe and tobacco box on his transfer to Liverpool in a similar capacity.

Miss MAGGIE STOREY, Operator, Sunderland, has been promoted to be Supervisor at the same centre.

Mr. S. Y. BENNETT, Assistant Engineer, Bath, was presented by the local staff with a serviceable kit-bag on his transfer to the inventory staff.

Mr. R. W. BELL, Local Manager, Rochdale, was presented with a kit-bag and purse on leaving to take up his new duties at Bristol in connection with the inventory staff.

Mr. J. WILSON, Cost Clerk, Bolton, and secretary to the Staff Benevolent Society, was presented by the staff with a kit-bag on leaving to take up his duties in connection with the inventory staff, Huddersfield. Mr. Wilson was accorded a hearty vote of thanks at a special committee meeting of the Benevolent Society for his services as secretary, to which the success of the society is largely due.

Mr. J. TURNER, Contract Officer, Bolton, has been elected secretary to the Staff Benevolent Society, vice Mr. J. Wilson, resigned.

Mr. FREDERICK TUFFIN, Exchange Inspector, Midland Exchange, Birmingham, left the Company's service on Sept. 22 to go to Sydney, Australia. He was presented with a shaving outfit by his colleagues in the Electrician's Department, who all wished him every success in his new sphere of life.

Mr. F. J. TINSON, Underground Foreman, who entered the Company's service in February, 1896, was, on resigning the Company's service, presented with a barometer as a token of esteem and good wishes for his future happiness, the presentation being made by Mr. W. Howe, District Manager.

Mr. A. EMLYN, of the Engineer-in-Chief's Office, on resigning from the Company's service on Sept. 27, was presented with a handsome crushed morocco letter case. The presentation was made by Mr. Prentice.

Mr. W. H. ROBERTS, Instrument Inspector, Nottingham, has been transferred to Sheffield.

Mr. H. SAYWELL, Nottingham, has been appointed local secretary to the Staff Transfer Association in place of Mr. P. R. Cockrem, who has been transferred to Headquarter's Inventory staff.

Mr. E. GASKELL, Fault Clerk, Nottingham, left the service on Sept. 1 to take up fruit farming in Canada. His colleagues presented him with an illustrated copy of Shakespeare's works.

Miss EVELINE HILDER, in the Fees Department at the Maidstone district office, has resigned her position to take up another appointment. On leaving she was presented with a travelling case by the staff.

Mr. A. SEABORNE, Collector, Brighton, has been transferred to Tunbridge Wells.

Mr. A. HARGRAVE, Contract Officer, York, on the occasion of his transfer to Manchester, was presented by the York staff with a gunmetal-cased watch and a fountain pen.

Mr. W. W. MORGAN and Mr. P. W. WHITING, Contract Officers, Hull, were, on the occasion of their transfer to Liverpool and Manchester respectively, each presented by the staff with a shaving set.

#### METROPOLITAN STAFF CHANGES.

##### Promotions and Transfers.

Mr. A. J. CROWE, Inspector, Gerrard, to Test Clerk, Hop.

Mr. C. WILSON, Outstanding Rentals Clerk, to Receiving Cashier, Salisbury House.

Mr. H. B. TAYLOR, Clerk, Metropolitan Stores Office, to Outstanding Rentals Clerk, Salisbury House.

Mr. B. R. BUXTON, Local Engineer's Clerk, Hammersmith, to Local Engineer's Clerk, North.

Mr. C. PHILLIPS, Local Engineer's Clerk, North, to Clerk, Divisional Engineer's Office, Sydenham.

Mr. W. HARNETT, Call Office Attendant, Salisbury House, to D.M.E.'s Clerk, Gerrard.

Mr. G. SMITH, Fitter, City, to Test Clerk, Gerrard.

Miss ETHEL HOWARD, Senior Operator, Gerrard, promoted to be Supervisor, Paddington.

On Miss MAY DE CHASTELAINE's promotion to Hammersmith as Supervisor she was presented by the Kensington staff with a silver backed hand mirror.

##### MARRIAGES.

Miss LILLA PATRICK, Operator, Farnham Exchange, recently resigned to be married, after over six years' service. Before leaving she was presented by the Guildford district staff with a case of cutlery as a mark of their esteem. The subscribers to the Farnham Exchange also presented her with a purse containing £17, together with an illuminated address, as a mark of appreciation of the courtesy and consideration she had shown them in the discharge of her duties. Miss Patrick was also the recipient of a number of other valuable presents from individual subscribers.

Miss KATE MOCKFORD, Chief Operator, Newmarket, who has resigned from the Company's service to be married, was on leaving presented with a handsome dinner service. The presentation was made, on behalf of the staff, by Mr. P. Summerville, Local Manager, Cambridge. Several telephone subscribers felt that the occasion should not be allowed to pass without the courtesy and efficiency with which she discharged her duties during the twelve years she was employed at the Newmarket Exchange being recognised in some way.

Mr. G. A. WHITTAKER, Exchange Inspector, Derby, was presented by the Local Manager, Mr. Stanley A. Young, on behalf of the staff, on the occasion of his marriage to Miss ETHEL GERTRUDE NELSON, late Travelling Supervisor in the Nottingham district, with a case of carvers, table spoons and a silver-headed batpin, the latter being for Mrs. Whittaker.

Miss NELSON on leaving was presented with a dinner service.

Mr. J. AKED, Local Manager, Keighley, was the recipient of a fumed oak clock and vases from the staff of the Keighley centre on the occasion of his

marriage, which took place on Oct. 5. The presentation was made by Mr. R. Norton, the oldest member of the staff, who voiced the good wishes of his colleagues.

Mr. JOHN TULLOCH, Stores Clerk, Chester, was married on Sept. 12, when the staff presented him with a basket of cutlery.

Mr. J. GRAHAM, Foreman, Dewsbury, who has been in the Company's service many years, was presented with a handsome copper kettle and stand on the occasion of his marriage.

Miss ELIZABETH HANNAH CRAIG, Supervisor, Sunderland, who recently left the Company's service to be married, was presented by the staff with a silver flower stand.

Mr. THOMAS E. THOMPSON, Wayleave Officer, Sunderland, was presented by the staff with an oak pedestal and two beautifully designed flower pots on the occasion of his recent marriage.

Mr. HENRY GEORGE SMITH, Inspector-in-Charge, St. Albans, was presented with a piano stool and cabinet, fire screen and coal scuttle, by the St. Albans and Luton district staff on the occasion of his marriage on Aug. 29.

Mr. C. WOOD, Exchange Inspector, Bradford, was presented by his colleagues with a handsome silver tea service and cruet stand as a mark of their esteem on the occasion of his marriage. Mr. C. Brocklesby, Electrician, made the presentation.

Lineman Inspector W. HASSALL, of Wednesbury, on the occasion of his marriage, was the recipient of a handsome copper curb suite, the presentation being made by the Local Manager of Walsall, Mr. W. Dalton.

Mr. T. WALKER, Wireman, Swansea, was, on the occasion of his marriage, recently presented with a handsome clock, subscribed for by the members of the Swansea engineering staff. Mr. W. J. Hodgetts, Engineer, made the presentation.

Miss LILIAN MILLS, Operator, Sheffield, on resigning to be married, was presented with a set of dessert spoons and forks.

Inspector H. SHAW, Sheffield, on the occasion of his marriage, was presented with a clock.

Mr. F. P. WARD, Correspondence Clerk, Sheffield, was on Sept. 23 the recipient of a handsome oak *scrubaire*, presented by the staff on the occasion of his marriage. Mr. Thyne, the Chief Clerk, made the presentation, and expressed on behalf of all the subscribers the good wishes for the future happiness of Mr. Ward.

Inspector S. F. CHAPELOW, Durham, was presented with a Queen Anne teapot by the staff on the occasion of his recent marriage.

Mr. T. A. FREEMAN, Fee Clerk, Southampton, was on the occasion of his marriage presented with an occasional table, the presentation being made by the District Manager.

Mr. A. J. SQUIRES, Assistant Rental Clerk, Southampton, who entered the Company's service in January, 1906, was on the occasion of his marriage presented with a music stool by the district office staff, the presentation being made by F. W. Richards, Chief Clerk. As a matter of interest it may be mentioned that Mr. Squires is also an artist, and has two paintings hung in the Southampton Art Society's Exhibition.

Miss J. GIBSON, Senior Operator, Selkirk, was presented by the members of the Border district staff with a handsome china tea set on the occasion of her marriage.

Miss EMILY MANEY, Mid Yorks district, Travelling Supervisor, was presented with an oak clock and silver cake stand on the occasion of her resigning to be married. She entered the Company's service on Feb. 24, 1899, and was promoted to be Travelling Supervisor June 18, 1909.

#### Metropolitan Traffic Department.

Miss AMELIA WILSON, Operator, Dalston, on leaving to be married, was presented by her late colleagues with a case of fish knives and forks.

The following operators at Holborn, who have left the service to be married, received the following gifts:—

Miss EMILY CASTLE, a coal scuttle and set of specimen glasses from the staff; a silver butter knife and a painting from personal friends at the Exchange.

Miss EMMA RAVENING a set of oak trays from the staff; brush and crumb tray and fern pots from personal friends.

Miss GLADYS CAVE (who is to be married in New Zealand), a clock and jam spoon from the staff; jam dish and tea cloth from late colleagues.

#### OBITUARY.

We regret to record the death of Mr. T. W. BATHGATE, Joiner, of the Manchester electrical staff, who died on Saturday, Sept. 24. Mr. Bathgate, who entered the Company's service in August, 1898, has been absent from duty since July 18. He was greatly respected by the whole staff, and was a very conscientious workman. The funeral took place at his residence, Kendal, on Sept. 28, flowers being sent by the electrical and clerical staffs.

We regret also to record the death by drowning of ex-wireman F. JEUNE and labourer F. JEUNE, jun., son of the former.

The father had for ten years been a member of the outside staff at Jersey, but had resigned therefrom during the present year. The son was still in the employ of the Company as a labourer. It appears they went on Oct. 16 for a trip to St. Aubins in the son's sailing boat when, on the return journey, a sudden squall struck the boat and caused her to sink, carrying young Jeune down with her. His body was found beneath the boat, but as no trace of the elder Jeune can be discovered it is presumed that his body has been carried out to sea.

Young Jeune was a most steady and willing workman, and was greatly esteemed by his comrades. He had been a member of the outside staff for the past six years. The funeral took place on Oct. 19, when a suitable wreath was sent in the name of the Jersey staff. The Company was represented by Mr. Howard Eady, District Manager, Mr. S. Amy, Chief Clerk, and Mr. J. J. Berry, Chief Inspector, Jeune's comrades in the gang acting as bearers.

### STAFF GATHERINGS AND SPORTS.

**Swansea.**—A smoking concert in connection with the Swansea Telephone Society was held at the Adelphi Hotel, Swansea, on Oct. 14, when a good muster of members spent an enjoyable evening. Mr. W. E. Gauntlett (District Manager) occupied the chair. An excellent programme had been prepared, the following artistes doing excellent service:—Messrs. E. W. Thomas, F. Tagholm, H. G. McArthur, J. Walker, W. Bevan, H. Cranage, C. Trickey, B. Francis and H. Dennis. Mr. H. P. Poole proved an excellent pianist. During the interval the chairman made a short but excellent speech, dealing with the work of the society and the need for the staff to render themselves as efficient as possible. Mr. W. Pennington (P. O. Sectional Engineer), on behalf of the visitors, expressed his pleasure at being present and meeting future colleagues in the telephone service of the State. The committee, Messrs. C. A. Bevan, H. G. McArthur, W. King and F. Tagholm, are to be congratulated on the successful results of their efforts.

**Newcastle-on-Tyne.**—A smoking concert was held on Sept. 28 in the Savoy Restaurant to bid *adieu* to those members selected for the inventory staff. There was a good attendance and an excellent programme was arranged and carried out under the direction of Mr. J. Jordan. Mr. F. W. Gaskins, who was chairman, took the opportunity on behalf of the district staff to present Mr. R. W. Jackson, District Engineer, with a handsome leather kit bag. Mr. Gaskins stated that the present was not given as a lave-taking, but as an appreciation of the staff's long association with Mr. Jackson and as a token of the esteem they held him in. Mr. Jackson in accepting the gift referred to his long association with the National Company, and the Northern District Telephone Company prior to amalgamation, and thanked the staff for the valuable assistance they gave him in carrying out his duties as late Local Manager and all those who had since served under him as district engineers.

**Edinburgh.**—*Amper's Golf Club.*—The final of the summer hole-and-hole tournament was decided over the Braid Hills course, when Mr. John Robertson defeated Mr. W. C. Black by five up and three to play.

**Sheffield.**—*Annual Trip.*—About 70 members of the Sheffield staff and friends had an enjoyable day at Cleethorpes on Sept. 17. A special train was provided by the Great Central Railway, and the journey was made in record time. On arrival the staff broke up into several parties and took full advantage of the amusements provided. The weather was quite tropical, and the staff were unanimous in the opinion that it had been one of the most enjoyable outings ever indulged in. One of the parties, who preferred boating by moonlight, had the pleasant experience of being landed by a horse and trap, which had to go out to them quite half a mile through the water owing to the lowness of the tide. Dancing on the pier ended the day, and the start back was made at 9.30 p.m. The committee for the arrangements were Messrs. R. F. Jones, C. Marsden, H. G. Rowe, H. A. Stokes, W. Thyne and Miss Raynor.

**Cardiff.**—The district staff held a smoking concert on Saturday evening, Oct. 1, at the "Marchioness of Bute" Hotel, Cardiff, to celebrate the appointment of the District Manager, Mr. B. Waite, as one of the sectional chiefs on the inventory staff. The chair was occupied by Mr. J. James, Engineer, and during the evening occasion was taken to make a presentation to Mr. Waite of a silver cigarette case and match box. Mr. James made the presentation, and asked the District Manager to accept the gift with the best wishes of the staff. Speeches were made by the Chief Clerk, Contract Manager and the Local Manager for Newport. The operating staff were unable to make their presentation themselves owing to Mr. Waite being out of town until that evening. However, the Traffic Manager, who was at the smoker, presented Mr. Waite with an umbrella and amber cigarette holder on their behalf. Mr. Waite suitably replied, and gave a short *resumé* of the work done since he was associated with Cardiff as District Manager. Towards the close of the evening the Chief Electrician presented Mr. Ginn with a pipe and tobacco pouch, Mr. Hague with an umbrella, and Mr. Smart with a walking stick on the occasion of their appointment on the inventory staff. The concert was thoroughly enjoyed by everyone present, and thanks are due to Messrs. Lucas, Bateman, Jennings and Garland, who so ably contributed towards the success of the evening.

### LOCAL TELEPHONE SOCIETIES.

**Bath.**—The opening meeting was held on Oct. 5, when Mr. R. A. Dalzell presided and gave an interesting address dealing with economy in telephone administration, illustrated by concrete examples, and emphasising the value of careful preliminary studies in relation to any proposed scheme. Mr. W. A. Taylor's paper, "Local Office Work," dealing with this branch in all its details, was also read. Interesting discussions followed, and the success of the inaugural meeting promises well for the forthcoming session, staff being present from Trowbridge, Swindon, Devizes, Bradford, Radstock and Chippenham.

**Birmingham Operators.**—The first meeting of the session was held in the central operators' dining-room on Oct. 13, the president, Mr. E. Williamson, being in the chair. A paper was read by Mr. M. Bowes on "Supervision," which was very interesting. The speaker dealt with the subject from the supervised point of view as well as the supervisors'.

**Bournemouth.**—On Oct. 12 the local society held its first meeting of the session. Owing to the wet weather only a small percentage of the members attended. The vice-president (Mr. W. Howe) occupied the chair. A very interesting paper was given by Messrs. Hunt, Beal, Moore and Bledon on "The Life of the Works Order," which was supplemented by the chief clerk, Hants, Dorset (Mr. F. W. Richards). Mr. W. Howe addressed the meeting and a very full discussion took place, followed by a vote of thanks to the speakers.

**Cardiff.**—A general meeting was held at St. John's Schoolrooms, Cardiff, on Sept. 6, when the syllabus for the session 1910-11 was arranged. The following officers have been appointed:—President, Mr. R. A. Dalzell; vice-presidents, Messrs. B. Waite, J. James, W. H. Kirk, W. J. Marsh and S. F. Whetton; hon. secretary, Mr. G. R. Woodworth; treasurer, Mr. E. O. Phillips.

**Dover.**—The fourth session opened with a very successful meeting at the district offices (Dover) on Oct. 11, when an excellent paper was given by Mr. E. J. Woods (Local Manager, Margate) on "Faults in Overhead Plant: How Preventable." Mr. C. F. Ashby (District Manager) occupied the chair. Mr. Woods illustrated his remarks by drawings and showed a number of interesting experiments. On the conclusion of the lecture some good points were raised and a keen discussion followed. There was a total attendance of 43, including seventeen non-members, mostly construction staff and faultsmen.

**Exeter.**—The committees have been appointed and a varied syllabus has been prepared, a start being made on Sept. 25. It has been decided to start a library in connection with the grant allowed by Head Office last year.

**Greenock.**—The annual general meeting was held in the Contract Department on Oct. 11, under the chairmanship of Mr. A. Ramsay Lamb. The hon. secretary submitted his report and briefly reviewed the past session. The balance sheet was read and adopted. The following office bearers were elected for the coming session:—Hon. president, Mr. F. Douglas Watson; president, Mr. A. Ramsay Lamb; vice-president, Mr. John A. Swanson; secretary and treasurer, Mr. A. Wilson.

**Gloucester.**—A meeting was held at the district office on Sept. 29 presided over by Mr. C. Elliott, District Manager. The balance sheet for the past session having been read, the following officers were elected for the session 1910-11:—Mr. R. A. Dalzell, president; Mr. C. Elliott, District Manager, Mr. F. W. Sceats, Assistant Engineer, vice-presidents; Mr. S. G. Hare, hon. secretary and treasurer.

**Hull.**—The annual general meeting of this society was held at the Shakespeare Hall on Oct. 17, under the chairmanship of Mr. A. K. Murray. After the minutes of the past session were read and confirmed, the secretary and treasurer presented their reports, which were adopted. The following officers were elected for the ensuing session:—President, Mr. C. C. Wortle; hon. secretary, Mr. A. E. Pinnock; hon. treasurer, Mr. G. R. Hill.

**Isle of Man.**—The first meeting was held on Oct. 3, when the president and officers were elected. A short address was given by the District Manager on the whole staff pulling together. It is proposed with the funds in hand to buy some more standard works on telephony and electrical subjects to lend to the staff. Prizes will be given for: First, the best three papers read during the session; second, the best suggestion or device to improve the system of working in any department; third, for the inspector who has the best kept district; fourth, the inspector who has the least ordinary faults on his section; fifth, the best timekeepers in all departments.

The second meeting took place on Oct. 14 at the new meeting room, Rosebery Chambers. A paper was read by Mr. G. Gillmore, District Manager, on "Preparations for Breakdowns on Overhead and Underground Systems."

**Leeds.**—The principal officers for the ensuing session will be Mr. J. C. Chambers (hon. president), Mr. W. V. Morten (president), Mr. W. R. Senior (chairman), Messrs. G. H. Sergeant and J. H. Corlett (corresponding and financial secretaries respectively). The session was inaugurated by a whist drive and dance, arranged by Mr. P. S. Niemann, on Oct. 21.

**Leicester.**—The opening meeting was held on Oct. 14. The president (Mr. F. Lucas) occupied the chair, and in a short introductory speech outlined the programme of the ensuing session, which promises to be of exceptional interest. Mr. Lucas emphasised the necessity of the continued loyal support of all members in regard to attendance and punctuality. Mr. J. Hyde, Sheffield, read a paper on "Automatic and Semi-Automatic Exchanges," which he illustrated by lantern slides. The lecturer has a masterly grasp of the system of automatic working dealt with, and was listened to with much interest by the members present: the attendance averaged 62.5 per cent.

**Southern (London).**—This, the oldest of the Metropolitan societies, opened a new session on Sept. 23, with a successful paper read by Mr. E. S. Byng, A.M.I.E.E., upon "The Factor of Safety." The president, who was in the chair, before introducing Mr. Byng, addressed a few remarks to the audience, who were present in good numbers, and, it is pleasing to note, included quite a number of visitors. At the close of the last session the following gentlemen were elected as officers for the present session:—President, Mr. W. Blight; vice-presidents, Mr. T. M. Inman, Mr. G. H. Payton; committee, Messrs. Baxter, Bignell, Hayes, Morphey, Shipton and Ware; hon. secretary, treasurer and librarian, Mr. H. W. Grant (Hop Exchange).

**South Midland.**—The annual meeting was held at the district office, Coventry, on Oct. 13, when Mr. J. Mewburn presided over a fair attendance of members. The hon. secretary (Mr. W. H. Oliver) read the fourth annual report and balance sheet, which, upon the proposition of the chairman, were unanimously adopted. The election of officers for the ensuing year was then proceeded with, and resulted in the following being elected:—President, Mr. J. Mewburn; vice-president, Mr. R. S. Grosvenor; secretary and treasurer, Mr. W. H. Oliver. A short address upon the objects of the society was then given by Mr. R. S. Grosvenor, which was followed by a short discussion, the main part of the latter being how to make the meetings more interesting to the members. It was decided to award the sum of £1.15. to the writer of the best paper given during the session by a member of the society.

**Swansea.**—A general meeting was held at the Docks Exchange Hall on Sept. 27, Mr. W. E. Gauntlett (District Manager) occupying the chair, when it was unanimously decided to continue the monthly meetings of the society during the coming winter. The balance sheet for last session was read, after which the election of officers was carried out. The following members of the society were elected:—President, Mr. W. E. Gauntlett; vice-presidents, Messrs. C. A. Bevan, A. G. Bristow and W. J. Hodgetts; secretary, Mr. W. H. Crook; treasurer, Mr. J. A. Thomas. An excellent syllabus is being prepared, and a successful session is anticipated. The first meeting takes place on Oct. 19, when Mr. W. E. Gauntlett (president) gives a paper entitled "The Present Position."

**Torquay.**—The first meeting of the session was held on Oct. 3, when the president (Mr. H. Reid) opened with an address and afterwards read a paper entitled "Traffic and Engineering Economy." Many interesting points were raised and discussed, and diagrams shown as the paper progressed. An enthusiastic discussion followed.



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## TELEPHONE MEN.

### LV.—CHARLES WILLIAM SALMON.

CHARLES WILLIAM SALMON was born in 1858 in London, where he was educated, first at a private school and finally at a grammar school, the curriculum of which included a special course of studies for those intending to enter the Civil Service. Whilst engaged in these studies, during the closing terms of his school life, he was offered a position in the East and West India Docks Company (now merged in the Port of London Authority), which, at that time, had recently remodelled its service largely on Government lines; and, seeing that the prospects held out appeared to be favourable, he accepted the offer. In due course, Mr. Salmon secured successive promotions, which had to be gained both by recommendation and by competitive examination. He still retains a very distinct recollection of the first time he saw and spoke through the telephone which afforded connection between two of the Dock Company's offices—a Gower-Bell instrument fitted with long, flexible ear tubes—and little imagined at the time that he would ever be engaged in the telephone enterprise. The time, however, was to arrive when the secretary of the United Telephone Company (Mr. Thos. Blaikie) invited, by permission of the Dock Company, those officials who cared to apply to take up a position in the former Company. Mr. Salmon was the man eventually selected and entered on his new duties in February, 1883.

After spending some time on the books connected with stores matters, he was placed in charge of the Stores Department, and although the changes he has witnessed during the onward march of the telephone industry, not only in the administration and *personnel* of the staff, but also in the type of material employed in the construction of the system, are many and great, his energies during the whole of his service with the Telephone Company have been solely devoted to work connected with the management of

that department. The United, being the parent Company to which the old National and Lancashire and Cheshire and other companies were subsidiary, and holding the patent rights, had the entire control

of all telephones used throughout the United Kingdom. It supplied them to these subsidiary companies, keeping a strict account of every receiver and transmitter so forwarded, and had to maintain a sharp look-out for instruments which infringed its patents. Many were the quaint and curious devices made by the enterprising in the hope of evading these patents, which, passing through Mr. Salmon's hands whilst these patents continued in force, were found to be infringements.

Looking back to the time when not only were Blake transmitters the best known instruments, but when some of the primitive Edison chalk transmitters were still in use, he is still able to view with amazement the vast strides which have taken place in telephone plant since that time, although his position has naturally familiarised him, step by step, with the improvements which have taken place in instruments, cable systems and switchboards, which latter, from fairly simple contrivances, have advanced to such marvellous complexities.

Mr. Salmon was not slow to realise the advantage of some knowledge of the technical intricacies of the work which he had undertaken, and shortly after his appointment he attended lectures on electrical subjects by Professor Sylvanus Thompson, and found these, together with the laboratory work and reading which he did at the same time, of great value in dealing with the affairs of his department.

On the amalgamation of the various companies under the title of the National Telephone Company, Mr. Salmon took over the charge of the department dealing with the stores required for the whole of the United Kingdom. Very soon after it was decided that



the ordering and supplying of all stationery should come into the department, and a system was instituted for dealing with this branch of work, which, after being improved from time to time, has resulted in the adoption of methods by which the enormous demands of the Company's various centres are enabled to be dealt with efficiently. To this work was added later on the control of a printing establishment, which from the employment of a single hand-machine worked by one compositor and boy-assistant has grown to such dimensions as to employ four large electrically-driven machines and thirteen compositors, and men of other grades.

The last branch of the Company's work delegated to the department which Mr. Salmon controls was the compilation of the Telephone Directory. Each year the work in connection with this gigantic publication increases, and the number printed during the last twelve months has reached a total of close upon a million of these books.

The Stores Department, outside its ordinary work, has recently been engaged in the compilation of a huge mass of figures, in reference to the Inventory of the plant which is being taken. This has meant three months' continuous late work for a large staff, the time of leaving on most evenings being nearer ten o'clock than five o'clock. It is, perhaps, not out of place here to say that if it had not been for the exceptional knowledge possessed by Mr. Salmon and his senior officers, coupled with the admirable way in which the staff engaged threw itself into the task set before it, the work would have taken considerably longer than it actually did.

Mr. Salmon does not court publicity. An effective worker and always at his post, his unique experience and knowledge of everything that appertains to the department over which he has presided for nearly 28 years has enabled him to render to the Company valuable and sterling service.

Mr. Salmon indulges in occasional games of tennis and billiards. His chief recreations however are walking and reading—mostly historical and biographical works.

## PAPERS.—THEIR WRITERS AND AUDIENCES.\*

By EUSTACE HARE.

(Concluded from page 158.)

I AM inclined to think that a paper which expresses views rather than facts, provided it is not strictly technical appeals to a larger audience (not a wiser, mark you) than either the "purely descriptive" or "productive" types, though it is not perhaps of the same practical value. One reason for this is that, as a rule, the subjects chosen are those on which all classes of our staff hold some opinion or are able to form an opinion as the writer unfolds himself. As an example one might suggest a paper on "Daylight Saving." This is a subject on which I suppose everyone is more or less interested, and I can imagine widely divergent views upon it, not only as to the main idea but as to the manner of carrying it out and the extent to which the principle should be applied. Possibly no one would be a penny the better or worse for the debate, but many would have something to say about it, and would say it, some with the consolation that the matter not being capable of unanimous agreement one opinion is as good as another, which is one of the charms of a debateable paper.

But perhaps its greatest use is achieved in this way: the number of men and women who have ideas and theories more or less vague simmering in their minds is legion, but the number of those who are able or think it worth while to spread them out, as it were, by committing them to paper is comparatively small. The initial difficulty of laying hold of them, their elusiveness may be, is enough to act as a deterrent and to swell the ranks of the visionary. They must wait for the man of persistence, with courage to attack and unravel them, with a natural or trained faculty for sequence of

reasoning, and who by practice in recording his thoughts has acquired the essential of writing—viz., exactness of expression. As Francis Bacon puts it in his essay on "Studies," "Reading maketh a full man; conference a ready man; and writing an exact man."

So much for papers in particular. I have now a few words to say on the writing of them in general, and first, I do not wish to be misunderstood in what I said just now about phraseology. The primary aim and object of a paper is to educate and to interest. That is to say, subjects, facts and theories come first; be the medium of expression ever so poor and crude, there they stand for what they are worth. But after that, and closely too, should come the careful choice of words with which, to the best of your ability, you may convey precisely what you have in your mind. I am not, be it noted, speaking of what is known as "style" or "mannerism," acquired or natural. These are totally different things, and are not strictly necessary for our purposes; they are for writers, *qua* writers, men who have to make a literary reputation or desire to leave one behind them. I am advocating care in this respect chiefly for the sake of clearness.

No one doubts that conciseness is a right and good thing to aim at, and that to compress an idea into a few words, while making it intelligible, marks a clever or painstaking man.

The more often you see your thoughts in type the more you will recognise the need and advantage of exact phrasing and phraseology. The well-known advice never to use a word of two syllables when a word of one will do is no doubt sound in principle, but if too slavishly followed may lead us into sluggish, slipshod roundabout ways, longer in the end and eminently uninteresting. To that advice I would add, "Never be afraid of a word, however long, which exactly conveys your meaning."

Avoiding, of course, the snobbery of the pedant, what reason is there that you should not give of your best? And to give of your best is to weigh every sentence you write. Doing this is to assume a standard of intelligence in your audience at least equal to your own, which is only what they are entitled to expect. If, to use a common expression, you are writing "over the heads" of your listeners, it is for them to discover it and not for you to pre-suppose it; and if you do, and attempt to alter your mode to suit a hypothetical situation, you are courting failure; for you will probably strike a note of insincerity, which your audience will be quick to detect and to resent. And a tinge of egoism is better than a layer of hypocrisy. I think it was Beethoven who once refused to alter a difficult passage in an overture "for the sake," as he expressed it, "of a pitiful fiddler." He intended that passage to stand the test of time, not of occasion; and in that sense, though perhaps a long way off, the position of the writer of a paper is similar. He is deliberately putting something down to run the fire of a critical audience, and as he puts it, so it must stand; he is not to be compared with a debater who must speak on the spur of the moment, and who may, without blame, regret he had not spoken better. The writer takes his own time, and if he makes not the best use of it is not to be excused for sins of incompleteness and inaccuracy.

It is almost superfluous to say that one of the most important points in a lecture or paper is to gain and hold the attention of your audience. It is true that "good wine needs no bush," but a natural corollary is that the drinker should possess a cultivated palate; and it must not be assumed that every listener is ready or is in the mood to take in and appreciate at once all you say. It is better, in my opinion, to carefully lead up to your point than to fire it point-blank and expand it afterwards; for by so doing you will awaken the keener interest, in the same way as a beautiful landscape is best appreciated when slowly revealed through a disappearing mist. A useful adjunct here is, I think, the employment of metaphor, but with a judicious and sparing hand, and not to the overwhelming of the idea you desire to fix, like an over-framed picture. Unless you exercise due caution and employ some art in leading up to your facts, giving time for them to ripen, the result will be that some of your audience will never gather them at all, while others in grasping them will miss important links in your chain of argument, which will only become apparent in the subsequent discussion.

But if discretion is needful in the use of simile, it is still more

\* It should be noted that in the first part of this paper in the November JOURNAL the words: "Bear in mind the writer propounded nothing, so far as I know," were, by a printers' error, transferred from the top of the second column of page 157 to the top of the first column of page 158.

needful in attempting humour. Telephone societies do not foregather for amusement, but for solid work; the members being, as a rule, very much in earnest, of which their presence alone is sufficient evidence; and to find their attention now and again distracted from the main subject by a writer's efforts to be funny must be jarring in the extreme. It disturbs not only the thread of the subject, but the hearer's interpretation of it: for every paper of merit demands concentration of mind on both sides, but especially on that of the audience which has to absorb in half an hour what the writer may have been weeks in preparing; and this is impossible where there are frequent interpolations of remarks solely intended to raise a laugh. If humour is introduced at all, it must arise naturally out of the context, must appear unenforced, and the drier the better. The worst form, of course, is that where the joke is really the central figure, to be approached sometimes very awkwardly—by the most subtle path that the originator can conceive.

But do not imagine I underrate the value of those occasional light touches which do so much to hold the attention and to mitigate monotony. They are the high lights of a good and interesting paper, and if tactfully used serve to set off the main idea in bolder outline; but they must be treated only as accessories, neither interrupting, nor interfering with the thread of your argument, but actually helping it.

To write frivolously is about as easy as to write ponderously: both styles may be "natural," but neither is good: the difference between the two probably being that the one is penned fluently and the other laboriously. Fluency either in an author or speaker is admittedly a gift, but it is a gift demanding judicious cultivation, or it degenerates into mere sound and fury. The fluent mood in an unaccustomed writer is a thing to be suspicious of. At such times it is not a bad plan for him to sleep on his output before finally approving it: my own experience being that the quicker one writes the more one has to correct.

To write crisply is not necessarily to write lightly or humorously, and it does not denote speed; more often the reverse, for to say much in a few words betokens great skill and much practice in the literary art. If you read the working lives of our greatest authors you will learn that many a line which runs so smoothly that it seems to breathe spontaneity is the result of hours of careful thought and of many alterations.

Lastly, the most difficult thing the writer of a paper has to do is to efface himself and to identify himself with his audience, both in the writing and the reading. Having chosen his subject on the strength of his knowledge of it, the one object before him should be to reach the mind of the meeting. In the time at his command he cannot hope to exhaust his subject; not a tithe of what he himself knows about it and how he came to know it can be put to paper. From the many phases and wanderings of his knowledge he must choose what he believes to be the chief and best points of his subject and work them out to a conclusion, if such be possible. And in choosing them he must make the best use he can of his sense of proportion, eliminating encumbrances and excrescences like the skillful summing-up of a judge. He should remember that in front of him are, maybe, fifty or a hundred intellects, some better, some poorer than, and some equal to his own, and he should imagine that collectively they represent himself, as he was before he put pen to paper. It is possible that not one in his audience would be able to recall at the finish every point he has put forward: to some, an idea here or there is deemed trivial or superfluous while the same idea to another has seemed all important; some will have fixed upon a point which particularly interested them, to the exclusion of many others or to the subject as a whole: while others will have done the reverse, have taken a birds-eye view without troubling about detail. No two will, perhaps, have received the paper in exactly the same way.

The writer need not reckon with this; the position is ordinary and inevitable. But what he should aim at, I think, is to make every point he has chosen so clear, so full, and so germane that the audience could, as a whole, if called upon, reproduce his paper in its entirety, and reproduce it in even a better and more complete form than he has. This, in effect, is for the writer to satisfy himself that, cancelling his previous knowledge, he could from his own paper learn all it was necessary to know of the subject.

Questions which the writer should steadfastly keep in the background are "What does my audience think of Me?" "Am I doing myself justice?" Quite unimportant and irrelevant, for it is your production they are thinking of and not yourself. For, a candle, in itself, attracts little attention at any time, but when lighted, is lost sight of altogether by reason of its illuminating power. "Have I done justice to the intelligences of my audience?" is, as Falstaff would have said, "a question to be asked."

## THE PUPIN SYSTEM APPLIED TO AERIAL TELEPHONE LINES.

(From Dr. EBELING's paper, concluded from page 162.)

### Lines with Double Coils.

When single coils are employed special apparatus must be erected on the A and B lines, that is to say that two apparatus are requisite at every coil-position. With double coils, on the other hand, each coil-position only requires a single apparatus, because the same iron core serves for the two windings of the A and B lines. As one would expect double coils to be less costly to construct than single coils for each coil-position, and the symmetry of the A and B lines to be better maintained with the double coils than with the single coils, the Siemens & Halske Company decided to make a trial to determine principally if such coils sufficiently resisted lightning. The values of the windings of the coils remain the same when the two windings are made exactly alike, even in the case of strong magnetisation on one side; this is proved by measurements made by Herr Nowotny on some double coils supplied by the Siemens & Halske Company to the Austrian Ministry of Commerce.\*

### First Trials with Double Coils.

As it was chiefly desired to determine in the trials of the double coils if storms produced frequent disturbances, it sufficed to make the trial on a line of short length. The Berlin-Magdeburg line, which traverses a very stormy region, being very suitable for such trials, the Siemens & Halske Company asked permission of the Imperial German Post Office to erect double coils on that line in lieu of the single coils, which were removed. Fig. 13 shows the

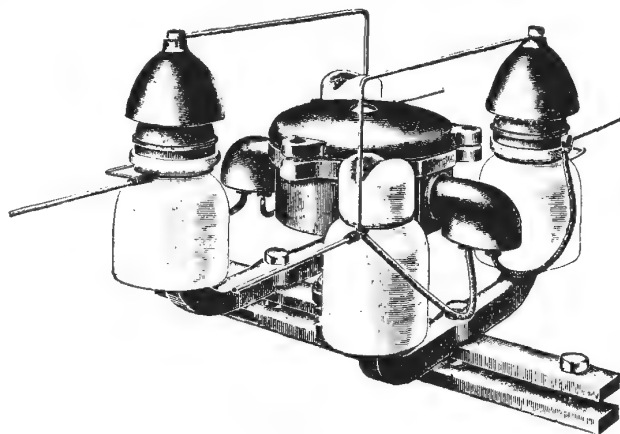


FIG. 13.

apparatus. An iron pot, in which is placed the double coil, carries two outgoing sleeves of ebonite through which pass the wires required for the two windings of the coils. This pot is mounted direct on the iron arm between two double insulators: one of the two insulators of each group carries an arrester. Fig. 14 shows the apparatus mounted on the iron arm.

This apparatus remained on the line for several years and only once was a coil damaged by a discharge of lightning. It must not be forgotten that the first apparatus should be considered as very primitive, and this single case might not have occurred had the construction of the apparatus been more perfect. In



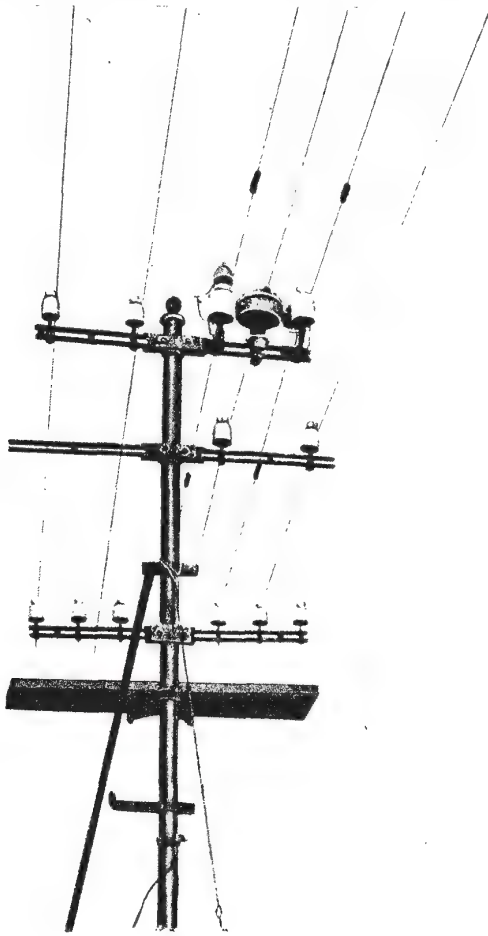


FIG. 14.

consequence of these results several telephone lines were equipped with double coils.

#### Double Coils in Metallic Box.

The Prussian Railway Administration has employed on a large scale double-coil apparatus with adapted arresters; these have been in service about two years without any fault arising and have given excellent results. In a region where violent storms occurred in the summer of 1908, no coils or arresters were damaged, so well the latter did their work. Fig. 15 shows the complete

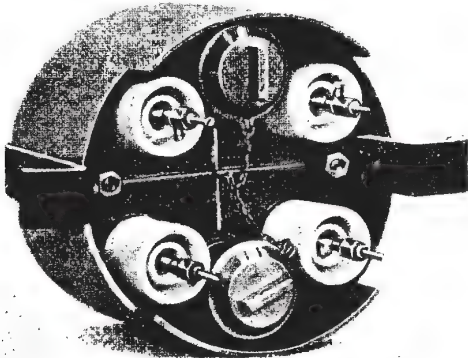


FIG. 15.

apparatus with its different parts. Fig. 16 shows two sets of apparatus of this sort mounted on iron arms for double wire lines.

The Austrian Ministry of Commerce has also had some lines equipped with double coils and Herr Nowotny has published some information in reference thereto.\* In all cases the expected increase in sound volume was obtained.

We will not stay to speak here of the different pupinised lines fitted with more recent types of apparatus, for various reports will doubtless be published relating to each of these lines. We confine ourselves simply to the remark that the pupinisation of telephone lines has already been carried out or is actually being carried out in several parts of Germany, and several other countries, and that even in the tropics a long line on this system is in course of construction.

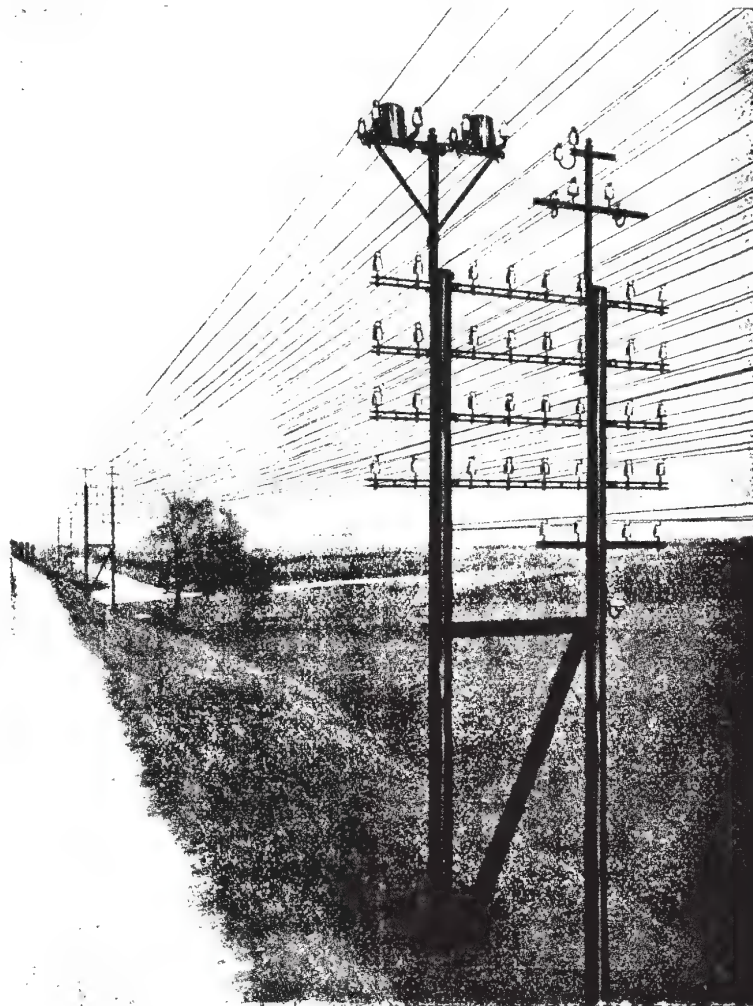


FIG. 16.

#### Economic Value of the Pupin System.

The result of the preceding is to show that the employment of the Pupin system on aerial lines has given good results in every case as regards improvement of speaking; the mechanical difficulties may also be considered as overcome by the employment of later types of apparatus, constructed in accordance with the results obtained from experience. To show the economic importance of the Pupin system to aerial lines we will give an example. Suppose we are dealing with the pupinisation of a 3 mm. bronze line. The coil-spacing will be 8 km., for the trials made by the Austrian Ministry of Commerce† have shown that aerial lines need

\* *Elektrotechnik und Maschinenbau*, 27, 1909. *E.T.Z.*, 1909, page 357.

† *Zeitschrift für Elektrotechnik*, 1905, 13.

not be so highly pupinised as was at first done. Under these conditions, an aerial line of 3 mm. bronze on the Pupin system will be as good as a bronze line without coils of at least 5 mm. Reckoning broadly and taking into account the reflection effects, which are produced when ordinary lines are connected to a Pupin line, and which cause a certain diminution of capacity, it may be allowed that in all cases the capacity of the pupinised line is equal to that of an ordinary line of 4.5 mm. wire. Allowing the price of bronze wire to be M. 1.70 (1s. 8½d.) per kilogram (2½ lbs.), which is not far from the average price, and supposing the price of the wire to be proportional to the cross-section, we shall have:

Price of 1 km. of double wire bronze line of 3 mm., about M. 220 (say £11).

Price of 1 km. of double wire bronze line of 4.5 mm., about M. 500 (say £25).

That is to say, an economy of M. 280 (£14) per kilometer on the price of the wire; the price of the coils must be deducted, which is about M. 50 (£2 10s.) per km. The kilometer of 3 mm. pupinised line will then cost M. 270 (£13 10s.), and the saving in comparison with a 4.5 mm. line is M. 230 (£11 10s.) per km. It may be said that a Pupin line costs one-half of an ordinary line. In the case of a 5 mm. line, the price of which is about M. 620 (£31) per km. of double wire line, and the capacity of which is generally attained by a pupinised wire of 3 mm., the saving is M. 350 (£17 10s.) instead of M. 230 (£11 10s.).

Suppose we are dealing with a line of 600 km. we have:

Price of 600 km. of double wire line of 5 mm., M. 372,000 (£18,600).

Price of 600 km. of double wire line of 4.5 mm., M. 300,000 (£15,000).

Price of 600 km. of double wire line of 3 mm., M. 162,000 (£8,100).

Saving as compared with line of 4.5 mm. pupinised, about 138,000 (£6,900).

Saving as compared with line 5 mm., about M. 210,000 (£10,500).

According to the preceding, the aerial lines on the Pupin system require no more maintaining than an ordinary line now that the faults of the first apparatus have been avoided in the new types; in these circumstances there is nothing to be set against the enormous economic advantages of the Pupin system for aerial telephone lines.

## THE RELATION OF THE ENGINEER TO THE TELEPHONE INDUSTRY.

By FRANK F. FOWLE.

(Concluded from page 165.)

We might go on almost indefinitely to point out the need of engineering and the consequences of a lack of it. But those who are interested in the subject, and it is to be hoped that this includes owners, managers and manufacturers in the industry generally, should read the paper prepared by a well-known engineer, Mr. Kempster B. Miller, on "Economy of Proper Engineering," presented at the 1909 convention of the International Independent Telephone Association. That paper is well worth the careful attention of every owner and manager who is sceptical about the value of sound engineering; the conclusion which was there forcefully pointed out may well be repeated here, in substance. Permanent success in the industry demands that a broad-gauge business policy and a broad-gauge engineering policy shall go hand in hand; they are mutually dependent and inseparable. The Independent companies cannot hope to become permanent institutions if they proceed in ignorance or violation of correct engineering principles.

For the benefit possibly of some who are unfamiliar with the practical side of the engineer's work, and the manner of his occupation, the closing section of this article will be devoted to a description or classification of engineers by occupation, with some explanatory comments.

### Classification of Engineers by Occupation.

The functions of the telephone engineer are so numerous and diverse, that it is difficult to group them so as to show fully the many lines of engineering occupation in the industry as a whole. Yet it is possible to show the typical or well-known branches. This has been attempted in Fig. 2.

ENGINEERS ..	CONTRACTING ..	Engaged in the business of plant construction under contract.
	OPERATING ..	In the regular employ of operating companies, and engaged in construction and operation.
	CONSULTING ..	Publicly offering their services in the general practice of engineering.
	MANUFACTURING SALES ..	In the regular employ of manufacturing companies.

FIG. 2.- CLASSIFICATION OF ENGINEERS BY OCCUPATION.

There are five typical branches of engineering occupation in the telephone industry; these are Contracting, Operating, Consulting, Manufacturing and Sales. These divisions are of a general character, and each embraces a number of specialties or distinct lines along which some engineers have devoted a great deal of their time. And there are numerous instances where engineers are so engaged as not to fall wholly within any one category of Fig. 2, an example of which is the case of individuals or firms which combine consulting and contracting.

The contracting field is of course pretty well understood, according to its definition in Fig. 2. There are numerous individuals, firms and companies who make a business of bidding for construction work of all kinds, under contract. Hence the term contracting engineer. There are several specialties in this field, which include exchange, cable, pole line and subway construction, etc. Those who specialise and those who do not so specify, as a rule, in some manner.

The operating field embraces practically the whole range of engineering except manufacturing. The larger companies usually have engineers in their employ in some capacity. The scope of the engineer's work depends, of course, upon the particular form of organisation under which he serves. The very large companies frequently have engineers in the different departments; sometimes these companies have engineers in executive positions. There is no doubt that the engineer possessing the natural temperamental qualifications and who has had a proper course of practical training and experience makes a business man of the highest type. But at the same time it is almost impossible for an executive officer to handle the problems of management and those of engineering, keeping fully up to date meanwhile in all branches of the business. In general it may be observed that the engineer of an operating company is valuable in nearly the same proportion that the business policy is of a broad-gauge character and the management places confidence in him.

The smaller operating companies cannot usually afford to employ an engineer regularly. This is a field which needs especially the benefits of engineering, and has too rarely enjoyed them. The problem for such companies can be readily solved in several ways. They may band together for the purpose of employing an engineer, individually or through their State Associations; or they may employ a consulting engineer from time to time as needed. There is no insuperable difficulty or excessive expense involved in any of these plans, and the benefits have already been elaborated upon. There is no doubt that the smaller companies have, in many cases, dispensed with engineering because of the belief that it could not be afforded. There should be every effort among engineers to correct this misapprehension, and educate these companies in the economy of engineering and the means of obtaining it.

The consulting engineer usually covers the whole field except contracting and sales engineering. His services are offered alike to all. In some cases consulting engineers have specialised along particular lines, but the telephone field has not yet warranted this to any considerable extent. The ethical rules of professional







## THE PSYCHOLOGY OF THE OFFICE.\*

By J. F. SCOTT, Glasgow.

"The old order changeth and giveth place to the new." The haphazard bookkeeping of the small trader has become the complex system of the huge composite company. The despised individual, who became a clerk mainly because of his lack of intelligence, is rapidly being replaced by the latter day adept whose speciality is, or should be, brains. Bookkeeping has become an art, and organisation a science.

At first consideration these statements appear more trite than accurate, but an examination justifies their use. In modern business the office distributes the work to other departments, gathers together their energy in concrete form, and realises the results. It is the regulator and recorder of all efforts made, the means whereby the financial success or failure of any venture may be known. It is that equivalent to the force of gravity which knits and holds together the organisation. Only by the perfecting of its methods has the huge nature of present-day enterprises become possible.

In approaching our own Company's commercial scheme we must not only know these general principles, but also the special conditions in which we move. Before the present artificial restrictions were imposed, the business of the National Telephone Company was in a continuous state of development which nothing short of a national calamity seemed likely to suspend. New systems were adopted, new facilities given, and each adjunct required special treatment; interests and responsibilities grew greater and demanded keener surveillance; and so it is that in office work, in order to cope with the fresh conditions, there has been built up by slow degrees a ponderous system of checks and counter-checks, of locks and inter-locks, of wheels within wheels, each planned to work in as nearly perfect unison with the whole as might be expected of additions and adaptations. For some time we have subconsciously viewed its intricacy with admiration; we have marvelled at its mechanical means of checking human inaccuracy; but the lamentable thing is that, as a staff, we have not yet gained that advanced attitude of mind which asks, intelligently, "IS IT ALL NECESSARY?"

In all evolutions there is a gradual growth from crudeness to intricacy, and then an intelligent reaction to simplicity when the essentials have been grasped. Our commercial system is in the intermediate or complex stage, and where there is much involved mechanism there is of necessity a liability to friction and discord. These it must be our task to eliminate or at least reduce, and the method has to be chosen. Either the complexity must be cleared, lock, stock and barrel, and replaced by a uniformly planned machine or the materials of which it is composed must be improved and the adjustment and oiling of each part perfected.

The machine may yet require to be remodelled from its foundations, but it would be an heroic task and therefore impolitic of advocacy in these closing years of the Company's licence. We turn therefore to the alternative—the improvement and adjustment of the materials, or, to dispense with the simile, the human element.

The system is complex; but there is nothing more startling, and at the same time edifying, than to examine this complexity, and make the inevitable discovery that much more is due to human inefficiency than to ill-planning of the basic scheme. We have come to regard a fair harvest of trouble as only to be expected; we have become so accustomed to jars caused by errors in fact, method, or omission, that we have almost ceased to regard them as such—in fact some of us are perilously near that frame of mind which marks the death of progress by believing that all is as well with our world as can be. This appears exaggeration, but its truth will be manifested later.

We are led to a statement. The result of any enterprise ultimately depends on the quality and attitude of the minds engaged

in it, and where these are defective, no system, however admirably planned, can be fully successful. *Our malady is a disinclination to probe further into matters than immediate necessity obliges us.* If we eliminate the apathetic condition of mind which is the root cause, we cure the disease.

First, however, we must give the patient conditions favourable to recovery, and this brings us to the consideration of *the employer's duty to the clerk.*

One scarcely expects to reap wheat where thistles have been sown, or to raise roses in a frosty atmosphere; and just as little can an employer expect to rear an efficient clerk unless he choose the proper material and supply the proper environment.

Let us engage our clerk. It has been the custom here in Glasgow to engage lads direct from school, and to train them in the sub-departments of our offices. A better method of giving the neophyte a comprehensive knowledge of the peculiar nature of telephone accounting has yet to be devised. It is also the custom to test very carefully the capabilities of applicants, and the necessity for this cannot be urged too strongly. Before an engagement is made there should be a thorough conviction that the raw material has every quality that will be called for, and it is well that the preliminary examination, rightly given in our offices, be rather too difficult than too simple. This for two reasons: first, that the company has no right to waste the time of a lad, who, though ill-suited for its necessities, may prove apt and smart at another calling; and second, that it is bad business to waste time in endeavouring to train unsuitable material. If then an employee fail after selection—with certain exceptions, where the reason is evident—the blame should be ascribed to the officer who made the choice.

The suitable clerk once obtained, the Company's duty to him does not end there. It pays to have a contented employee, one who is confident that his work is appreciated, and so realises that his future is identified with that of the employer. We have little to complain of in this respect, but there should be continual vigilance exercised in order to distinguish those American methods which are praiseworthy and desirable from those which are eminently undesirable. If the enthusiasm of the American telephonist be as real as our reports show, then it must have been fostered on the first and not on the second part of the famous war cry, "Get on or get out!" It would not have conduced to the safety of Blondin to hear behind him the voiced warning that Niagara was fierce and deadly; and surely in these competitive days it is unnecessary to warn us of the all too apparent dangers of failure. A few judicious words of appreciation or encouragement are more valuable in effect than a thousand threats: the former stimulate to higher voluntary service, while the latter goad to what is necessary, but no more. To put it in lighter vein, the whip never moved the stubborn donkey, but the bunch of carrots worked wonders. In our case the carrots should not, like the mirage, be a visionary show which the traveller never gains, but should resolve themselves into tangible entities equitably distributed.

So much for the recognition of merit, but a more difficult task is the appreciation of the true value of errors. Mighty consequences may follow a slight omission, but the extent of the condemnation should be gauged by the circumstances which gave rise to the mistake, and not by its results. There are, of course, some heart-breaking cases where nothing short of physical violence seems to impress: but justice, tinged with leniency, is generally more politic, for the real mission is not to terrify the culprit, but to get him to realise his error and rise above it. The departmental chief should not see everything; there are times when a man should be left to work out his own salvation. To censure for each slight misdemeanour will undoubtedly weaken the effect when a really severe reprimand is incurred.

There should be a feeling of friendship between a chief and his juniors. The extending of sympathy does not mean the sacrifice of dignity, and he who maintains the contrary convicts himself of weakness. So far as duties will allow, each man should be given opportunity to perfect his knowledge of all branches, if for no other reason than that the Company will also reap the benefit.

In justice it must be allowed that our conditions more nearly approach this ideal environment than do those of most businesses

\* Paper read before the Glasgow Telephone Society, and awarded the first prize by the Company for a paper on "Office Work," 1909-10.

of a like nature; but it is so far insisted on because we cannot remain satisfied with the survival of the fittest—all must at least have opportunity to become fit. Given these favourable conditions, the clerk who fails need look no further than himself for the reason.

Following natural sequence, we now proceed to consider *the clerk's duty to his employer*.

Here we approach what should prove a more pleasant theme, for the duty of the clerk to his employer and his duty to himself are synonymous; the welfare of each is dependent upon his exertions. The sequel aspires to show in what manner these exertions fail.

First, however, we must recognise that a broad difference exists between clerical and technical work. As a general rule there are few deviations from recognised methods in engineering and electrical work, and accordingly a thorough knowledge of certain clearly defined subjects and a dexterity in handling tools are the first essentials, the possession of these enabling the ordinary workman (mark—the ordinary workman) to perform his duty satisfactorily. The addition of a thinking mind is certainly the lever which raises its owner and should be striven for; but its absence in the rank and file may be compensated by frequent recourse to plans and diagrams, and is not therefore unduly apparent.

In office work, on the other hand, knowledge, though a prime necessity, is subservient to mind-power or judgment. The broad basis of the work may be learned by a zealous student in a few days, but when this has been accomplished only a very minor step has been taken towards the making of a good clerk. No matter how obscure our clerk may be, in his work there continually arise special cases which demand the exercise of original intelligence, and he speedily discerns that Service Instructions are merely an inadequate framework around which the individual must build a constantly changing structure. Each clerk's duty is distinct in nature from those of his *confères* and for the time being he is its specialist. He has in his hands the opportunity of materially assisting others or of causing them endless inconvenience. An engineer or electrician may complete the work partially carried out by another, but, unless the threads have been carefully gathered together, one clerk cannot at a moment's notice supersede a colleague without inevitable miscalculation and misunderstanding.

The appreciation of these facts in conjunction with the importance of office functions leads one to the decision that the clerk is a greater potentiality than he yet knows, and that, since he lacks this realisation, he is less potent than he should be. He undoubtedly fails in quality, not in kind. This is the malady of which we spoke, a malady whose existence may be made manifest by citing an instance.

Some years ago there was arranged a system for carrying out a certain piece of work, comparatively simple and unimportant in itself, but whose neglect would have grave consequences. Let the system be imagined as a small chain, the links being the several clerks who were concerned in it. An error occurred, and, its seriousness being observed, a check on this part of the chain was immediately added—in other words, the single link was replaced by a double one. The chain was subsequently broken down at every possible place, and, although it is now at least double-linked in every part, he would be an optimist who, in face of past experiences, would guarantee immunity from further trouble. Let it be noted that there is nothing wrong with the system; the blame lay with those whose duty was to perform the work. This case is flagrant, but its counterpart would not be hard to find. Too often there is the lackadaisical idea that, if only the work is done, the manner of doing it is of little moment; too great attention is paid to precedent; the exertion of thinking an original thought, and so creating an improved method, seems to be beyond many of us. And the reason for all these shortcomings is the lack of an intangible something, which may be defined as "*active intelligence*." It is just the presence or absence of this quality which causes the difference between what a clerk should be and what he too often is; he may as a thinking power have an incalculable effect, or he may sink to the level of a mere automaton.

Looking further into the matter, we find it to be simply a case of buried talent, for assuredly none would be brought to admit himself incapable of its exercise. Every clerk when promoted to a

new position keeps his eyes and ears alert until he has gained mastery of the methods. His routine work becomes second nature, and he is able to perform it mechanically, without conscious function or thought. This is the crisis. Many relapse into a state of apathy, believing without consideration that the ultimate goal has been attained; and, if further promotion does not come so quickly to them as to their more energetic colleagues, they blame some vague injustice which they cannot coherently explain.

The antithesis of this is the correct attitude. The clerk worthy of the name must maintain his original alertness. The fact that his routine work is now second nature should make him free to discern the "Why?" of things. No item which gives the slightest suspicion of inaccuracy should pass his hands till a scrutiny has justified it. Though primarily responsible for his own work, he must also hold himself answerable for the proper handling or reporting of any deviation or inaccuracy which may come within his knowledge. The supreme ideal is the worthy attainment of a reputation for infallible accuracy and thoroughness.

The disease exists; and its cure, the possession of this active intelligence, would not only enhance the individual's worth and consequent promotion, but would also rid the office of its greatest curse—the mistake. It is not too much to say that half the friction between subscriber and Company, and more than that proportion of our internal discords are due to preventable errors. The employer has been asked to deal lightly with these, but it is certain that no clerk can be too harsh in his condemnation of himself. The three most flagrant species of error are those of judgment, of omission and of carelessness. Judgment is dependent upon the development and experience of the individual, and errors of this nature may be dispensed with in an exhortation to think well before acting. The other types are inexcusable, and cannot be condemned in the abstract too strongly. Those of omission are due to lack of method, and the clerk without method, is like a ship without a rudder—adrift and lost. The captain who set out in such a ship would be characterised as a "culpable idiot"—the methodless clerk may be left to apply the necessary expletive to himself.

The most common error of all, however, is that usually described in our officials' dealings as "inadvertent"; or, in plainer language, the result of negligence. It can only occur where the mind is wandering to other, perhaps more agreeable, topics: when, to take a case in point, the work is being carried on concurrently with a discussion on sport or fashion. Lack of concentration is the undoubted invariable cause, and this cause is the hardest of all to uproot. There is but one cure—one easy to explain but difficult of continual application—to confine the attention wholly to the immediate work in hand.

Assuming that our clerk has realised the necessity for this active intelligence—this wonderful elixir which is to transmute his partial effectiveness into ideal usefulness—his next step must be the gaining of knowledge. First he must see to it that he understands the framework of the Company's bookkeeping, and especially in what respect each official return hinges on and affects the others. It is no uncommon occurrence for one clerk to make an adjustment in a manner which, although setting his own house in order, throws out of gear that of a colleague, when a little understanding, coupled with a little thought, would have clearly discovered the correct method. And the guilty parties are not always amongst those of slender experience.

In reviewing the subjects with which a clerk must have acquaintance we meet a curious diversity of opinions. Our easy-going friend asserts that, given a knowledge of the "three R's," he requires no further stock-in-trade than his intelligence. The ambitious man, on the other hand, finds to his dismay that there is scarcely one subject he can afford to disregard—scarcely one which will not possibly be called for if his ambitions are to be realised. The question is so wide and has been so fully dealt with in the JOURNAL that it would avail little to expand here. There is one pitfall, however, of which it may be well to give caution. The test of knowledge acquired is the value of its application. Many minds are like the valve of a pneumatic tyre—they have a wonderful capacity for drinking in, but there is no outflow. The clerk is judged by on his outflow, and he must therefore be careful to see that his study makes not so much for erudition as for practical utility.

(To be concluded.)

## TELEPHONE WOMEN.

## LXXX.—HELEN P. WEIR.

MISS WEIR, Chief Operator at Dumbarton, entered the Company's service in June, 1889 (although to judge by her appearance she must have been almost too young for business at that time), as sole operator in Dumbarton Exchange. There were very few facilities then for the training of operators, so that the subject of our sketch was left to pick up her duties in a somewhat haphazard fashion: and although the traffic was comparatively light, the conditions and working apparatus were so different that an operator required to exercise a great deal more patience than is called for nowadays.

Miss Weir has served under seven district managers, all of whom can testify to the ability, tact and sound common sense with which she has discharged the numerous duties pertaining to her



HELEN P. WEIR.

position. For the last year or more she has from time to time acted as Travelling Supervisor in the Dumbarton and Oban centres, and has proved very efficient in that capacity.

## LXXXI.—MINNIE SLEEFORD.

MISS SLEEFORD, the present Chief Operator at Chatham, entered the Company's service in that town in March, 1897, and has spent the whole of her business career in the telephone service. At that time Chatham was in the Canterbury district, but shortly afterwards the districts were reorganised and a district office created at Maidstone.

The switchboard in use when Miss Sleeford joined the service

was of the single cord pattern with transmitters suspended in front of the operators, and all lines were earth circuits.

In 1906 an extensive underground system was carried out, and the whole of the subscribers from Strood sub-exchange, which was



MINNIE SLEEFORD.

closed, were transferred to Chatham. In the same year a new 300-line switchboard section was added, making a total equipment for 630 direct lines and 48 junctions, and the switchroom, which is now considered the most spacious in the district, was extended.

Miss Sleeford is of a kindly nature, is very popular amongst the staff, and has shown considerable tact in dealing with difficult subscribers. She takes an active part in religious and social work and is a Sunday School teacher at St. Nicholas Church, Rochester, her chief hobbies being walking and reading.

It may also be added that Miss Sleeford has served under four district managers and five local managers.

## DEATH OF MR. R. GILMOUR.

WE regret to announce the death of Mr. R. GILMOUR, District Manager, Edinburgh, which took place on the evening of Saturday, Nov. 19, at his residence, Belgrave Road, Corstorphine. He was at business that day, and left his office apparently in his usual health. In the afternoon, however, whilst conversing with his wife and son, he was suddenly taken ill, and died later in the evening without recovering consciousness.

Mr. Gilmour, who for some time had not enjoyed good health, was born at Paisley in 1865, entering the telephone service at a very early age. He was District Manager at Belfast from 1896 to 1909, when he was transferred to Edinburgh on account of his health. His portrait and biography were published in the JOURNAL in June last.

The funeral took place on Nov. 23 and was attended by the Scottish Superintendent (representing Mr. Goddard, General Superintendent), Mr. Fulton (representing Mr. Gill, Engineer-in-Chief) and by a large number of the Edinburgh staff. Amongst many beautiful wreaths were those from Mr. Goddard, Mr. Watson, the Engineer-in-Chief and his staff and the Belfast and Edinburgh staffs.



## A YEAR'S GROWTH OF THE TELEPHONE.

By W. H. GUNSTON.

If any apology were needed for returning to this subject it is to be found in the fact that the statistics of telephone development in the world are far from being of merely academic interest; and to us in England, debarred by strange handicaps and capricious reversals of policy from attaining our fullest development, the enormous expansion of the telephone system in some countries, together with its causes, and the failure to make progress commensurate with the importance of the country in others, are full of significance and instructive lessons. Recent statistics of telephone development are notoriously difficult to obtain. In countries where telephone companies are numbered by the thousand or hundred, as in the case of the United States and Brazil respectively, the task is impossible. A recent Government census in the one case, and some enquiry as to the larger systems in the other, enables us to get sufficiently approximate figures. The articles published in the JOURNAL last year gave the most complete statistics of the kind that had hitherto been published, and that considerable interest is being displayed in such figures is evidenced by the fact that since their publication Herr von Helldig has published a similar statistical article in *Electrotechnik und Maschinenbau*; and, from a source which I have not been able to trace, paragraphs on the same subject (to which reference was made on page 32 of the present volume of the JOURNAL) appeared in the general Press last spring. Lastly, the *American Electrical Review* of June 25 last published a comprehensive article on "The Telephone Industry of the World," which it claimed as the most complete and interesting *resumé* of the kind that had ever been published.

There will be nothing unexpected by our readers in the demonstration that this country is not keeping pace in rate of development with some of its rivals. So important a part is the telephone playing, and so increasingly vital a part is it destined to play in commercial progress that the proper development or otherwise of the industry must infallibly leave its mark in each country (in the shape of increased vigour or decline) on that progress in so far as it relies upon this most efficient and rapid of all means of communication. Much has been said in the JOURNAL and much more must be said of the necessity for Great Britain to go full steam ahead in telephone development. While the telephone is marking time, not only is its development in this country lagging behind that of others—a matter of great national importance but urgently necessary work is being withheld from the employable.

Unless otherwise denoted the following figures refer to Jan. 1 in each year. Much later figures could of course be given for Great Britain, but for purposes of comparison the development up to Jan. 1 last has been taken all round.

## EUROPE.

Great Britain and Ireland had 601,269 telephones in 1910 as against 565,854 last year, the number of inhabitants per telephone being 68. Of these 503,643 were on the National system, 92,626 on the Post Office and about 5,000 in the two extant municipal systems.

The following are the principal urban systems:—

	1910.	1911.	Population per telephone.
London ... ..	104,208	121,011	36
Glasgow ... ..	43,928	42,855	24
Liverpool-Birkenhead	26,849	27,783	37
Manchester-Salford ...	21,209	23,462	47
Birmingham ... ..	13,479	14,336	64
Edinburgh-Leith ...	10,889	11,791	44
Hull ... ..	10,800	11,060	24
Leeds ... ..	9,072	9,365	55

Germany, with 940,966 telephones as against 851,319 last year, is fractionally better than this country in its proportion of population to telephones, which is 65. The development of the principal towns shows Berlin 111,751, Hamburg 53,580, Munich 24,972, Frankfurt-on-Main 20,932, Leipzig 20,682, Dresden 18,104, Cologne 17,471, and there are six others with over 10,000 stations.

France has 211,728 stations as against 194,159 in January, 1909,

and the number of souls per telephone is 186. The largest systems are Paris 69,205 telephones, Marseilles 5,975, Lyons 5,283, and Bordeaux 4,137.

Sweden has 179,174 stations (114,734 State, 54,440 company) as against 158,503 last year. The average number of inhabitants per telephone is about 30. Stockholm has 66,669 stations, Gothenburg 11,241, and Malmö 6,018.

Austria-Hungary.—The total number of telephones in the Austro-Hungarian Empire last January was 144,684 (over 250 inhabitants to every station) as against 124,825 last year. The administrations in the two component countries are, however, distinct. Austria numbers 94,978 telephones (of which in Vienna there are 41,070, in Prague 6,314, and in Trieste 3,379) and Hungary 49,706 (of which 12,377 are in Buda-Pesth).

Russia.—The latest official figures received are for January, 1909, when there were 112,885 stations in existence. They may now be put at about 127,000, or one for every 1,022 of population. The number of stations in St. Petersburg is 27,619, in Moscow 26,140, and in Warsaw 18,079.

Denmark.—The figures in the official annual are given in subscribers' lines. The Copenhagen Telephone Company give the total number of stations in Denmark at the beginning of 1909 as 78,233 and at 1910 as about 86,000, or one for every 30 inhabitants. Denmark thus fairly shares with Sweden the first place in Europe for proportionate development of telephones. Copenhagen and suburbs have 40,474 stations.

Switzerland has 73,758 stations, as against 69,122 last year—i.e., one for every 47 inhabitants. Zurich has 10,250 telephones, Geneva 6,750, Basle 6,015 and Berne 4,005.

Italy has 62,266 telephones, as against 53,721 last year. Milan has 9,886 stations, Rome 9,014, Genoa 4,907 and Turin 4,063. Population per telephone, 552.

Norway had 58,026 telephones in 1910 and 53,726 in 1909. The present development is therefore one telephone to every 39 inhabitants. The latest figure for Christiania (the largest town) is 15,535 at the end of June, 1909.

Netherlands.—There are 52,635 stations in Holland (of which 30,904 are municipal, 16,185 private companies and the rest State), as against 47,421 last year. Amsterdam has 11,761, Rotterdam 6,669 and the Hague 7,015 stations. The number of inhabitants per telephone is 113.

Belgium has 42,540 telephones, as against 38,503 last year, a proportion of 167 inhabitants to every telephone. Brussels has 15,042 telephones, Antwerp 5,850 and Liege 4,001.

Spain has 20,855 telephones, or over 900 people per telephone. Last year there were 18,462 stations working. Madrid has 3,131 telephones and Barcelona 4,210.

## SUMMARY OF EUROPE.

	January, 1909.	January, 1910.	Percentage of increase
Germany ... ..	857,319	940,966	10.5
Great Britain ... ..	564,400	601,269	6.5
France ... ..	194,159	211,728	8.3
Sweden ... ..	158,503	179,174	13.3
Austria-Hungary ...	124,825	144,684	16.1
Russia ... ..	112,855	127,000	13.1
Denmark ... ..	78,233	86,000	10.2
Switzerland ... ..	69,122	73,758	6.7
Italy ... ..	53,721	62,266	16.1
Norway ... ..	53,726	58,026	8.1
Netherlands ... ..	47,421	52,635	10.7
Belgium ... ..	38,503	42,540	10.5
Spain ... ..	18,462	20,855	13.1
Roumania ... ..	10,520	12,000	14.1
Portugal ... ..	4,975	5,468	12.2
Luxemburg ... ..	2,902	3,100	6.9
Bulgaria ... ..	1,930	2,500	29.5
Servia ... ..	1,550	1,750	12.9
Greece ... ..	1,300	1,400	7.7
Iceland ... ..	672	900	34.1

\* Estimated.

There were thus upwards of 2,628,000 telephones working in Europe at the commencement of the year.

## ASIA.

The total estimated in the JOURNAL last year, viz., 100,400, has proved to be substantially correct in the light of later official returns. The only Asiatic State where rapid development has been made is in Japan. There were 71,430 stations in this Empire at the beginning of 1909 and 81,447 in July. The total for January, 1910, is therefore about 91,000. There are about 24,000 telephones in Tokio and 10,000 in Osaka.

Making due allowance for the increases in the British and Dutch Indies, the number of telephones in Asia as at Jan. 1 last may be put at 123,000.

## AFRICA.

There is little change in the position in Africa. Egypt, Algeria, Transvaal and Cape Colony have the four largest systems. Probably not more than 2,000 stations have been added during 1909, making a total existing at Jan. 1, 1910, of about 27,000.

## NORTH AMERICA.

Canada.—Here we have an example of one large company (the Bell) operating 117,539 stations (as against 103,770 last year), and several government systems and independent companies operating the remaining 60,000 odd stations. There were 25,300 subscribers in Manitoba in the beginning of the year, and the total for Canada may be computed at about 180,000 stations. As regards the large cities, there were 27,037 telephones in Montreal, 28,154 in Toronto and 12,717 in Winnipeg.

United States.—The American Telephone and Telegraph Company and the systems in connection therewith increased from 4,634,620 to 5,142,692 during 1909, a percentage of increase of 10.9. The stations of the innumerable companies of the Independents are difficult to estimate, but the figure in the *Electrical Review* of Chicago last July, viz., 7,083,900 stations for the whole of the United States (Bell and Independent Companies) is, no doubt, as accurate as it is possible to attain. This means that there are between ten and eleven inhabitants in the States to each telephone. The Bell Company's development in the large cities is New York, 361,302; Chicago, 207,710; Philadelphia, 105,425, and Boston, 120,769.

Mexico.—The official figure of the total subscribers in Mexico at Aug. 31, 1909, was 16,700. The number of subscribers in the two systems in Mexico City in July this year was about 11,000.

West Indies.—The *Electrical Review* gives 12,600 as the number of stations in these islands.

Total for North America 7,293,300.

## SOUTH AMERICA.

The largest systems are those of the United River Plate Company (in the Argentine), the Chili Telephone Company, and the Monte Video Telephone Company. The telephone in Brazil is operated by numerous companies situated in the various towns. The position has not greatly changed since 1909, except for a steady increase in the more progressive States, and the total number of stations on this continent should be about 65,000.

## AUSTRALASIA.

No later information has been obtainable with regard to Australia than the figures as at the beginning of 1907 which were used as a basis for the estimate in my article of last year. As regards New Zealand, the number of connections has increased from 26,833 in 1909 to 29,681 in 1910, an increase at the rate of 10.61 per cent.

There are altogether upwards of 80,000 telephones in Australasia.

## SUMMARY.

Europe	...	...	...	2,628,000
Asia	...	...	...	123,000
Africa	...	...	...	27,000
North America	...	...	...	7,293,000
South America	...	...	...	65,000
Australasia	...	...	...	80,000

10,216,000

To the list of cities possessing over 10,000 telephones which was given in the JOURNAL of November last, may be added Hanover (Germany), Zurich (Switzerland), Osaka (Japan), and Mexico City (Mexico).

It will be seen from the foregoing that the percentage of increase during the year in the larger States is as follows:—

Japan (Government)	...	...	29.0
Austria (Government)	...	...	18.4
Sweden (Government and Company)	...	...	13.3
Russia (Municipal, Government, and Companies)	...	...	13.0
U.S.A. (Bell Company and connections)	...	...	10.9
Germany (Government)	...	...	10.5
Canada (Bell Company only)	...	...	10.4
Denmark (Government and Company)	...	...	10.2
France (Government)	...	...	8.3
Great Britain (Government and Company)	...	...	6.5

The high percentage of Japan is no doubt due to that country's having a great deal of leeway to make up, telephonically speaking. In Austria the measured rates must be accountable for the spread of the telephone. In Russia the energetic companies in Moscow and Warsaw have made rapid progress. But in each of the foregoing States it must be remembered that the telephone development has been so low in the past that any noticeable progress sends up the average in a way that would be impossible in a well-telephoned country. The reason for Great Britain's low position in the list is too well known to readers of the JOURNAL to require explanation.

## THE PASSING OF THE N.T.C.

By JOHN S. RHODES.

Old Father Time with sharpened scythe  
Is mowing down the years.  
The N.T.C., till now so blithe,  
Has quickened hopes and fears.  
From odds and ends by skilful art  
Was wrought a mighty whole,  
Which in its glory must depart  
And pass to State control.  
While "Trunks" had always carried weight  
They soon developed more,  
So, purchased by a watchful State,  
The "Trunks" passed on before.  
Though "single" lines were mainly run  
'Twas better they were "double,"  
Subscribers said—when this was done—  
That "twins" gave little trouble.  
Old worries had become so great  
With aerial wires around,  
That cables then—how sad their fate—  
Were buried underground.  
"Magneto work has had its day"  
Runs one of time's decrees,  
For under common battery sway  
More calls can "pass" with ease.  
The cuckoo-egg of "measured rate"—  
Hatched in the "flat rate" nest—  
Has grown a bird so up-to-date  
'Twill soon edge out the rest.  
Now if the "transfer's" not a dream  
(Or old yield place to new),  
Why should an active pension scheme  
Be bid a last adieu?  
In royalty three million pounds  
Was paid into the State,  
The staff all helped—and on these grounds:  
"Keep pensions on the slate."  
In service years the staff is old—  
A truth they can't surmount,  
'Tis only justice thrice-enrolled  
To let "past service" count.

# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

*Published Monthly at*

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VOL. V.]

DECEMBER, 1910.

[No. 57.]

## THE CONSTRUCTION STAFF.

BEFORE these pages are published the staff will have had before them the President's "Memorandum on the continued employment of the Company's Staff on Construction Work," dated Nov. 23. The reassuring statement that the Board has decided to continue canvassing and consequent development of the telephone service for a later period than was previously contemplated, and that unless unforeseen circumstances arise the existing staff will be retained until the end of the license, will lift a heavy burden of doubt and apprehension from the minds of many of the employees of the Company. To have served the Company faithfully for many years and to be within sight of permanent employment by the State, only to lose all prospect of continuous work within the last year of the Company's life, was the hard and unmerited lot which threatened a large number of the construction staff—experienced, capable and well-trying men. And yet, as a commercial concern, the Company was placed in a position with regard to these men of considerable difficulty. Negotiations with the Post Office for the provision of a joint-purse scheme to enable construction work to be carried on, not only from hand to mouth but at full pressure, came to nothing. As, therefore, the construction work gradually ceased during 1911 the construction staff would have slowly dwindled away, together with other sections of the staff, whose work was chiefly dependent on new construction. It was not a case of being generous to one or two old servants. It was not a case of stretching a point and making work for a brief period for a small number of men temporarily not required. It was an infinitely larger question with which the Company was faced.

The Company, realising the grave hardship to which a large body of the staff were exposed, reviewed the position with a view to finding some remedy. The situation since negotiations with the Post Office began a year or two ago was somewhat changed. A considerable number of men had, unfortunately, during the last two years been discharged. The construction staff which then existed was engaged not only on the joining up of new lines, but also in the important work of anticipating future developments, in accordance with the policy of all progressive telephone administrations. The Post Office being unable to give adequate assistance in the solution of the problem, although all that was asked of them was to assist in the full and necessary development of their own future property, the number of new lines which were being connected up every month was ascertained by the Company and it was found that, if that rate of connection was maintained until the end of the license, employment could be found for the construction staff in its present dimensions. The Company, therefore, decided not to discontinue canvassing or the running of new lines even after the period when they will no longer be fully remunerative, but will go on utilising spare plant until the end of 1911. A means of employment for all the existing staff will thus be assured. We believe the considerate action taken by the Board to avoid the necessity for further dismissals will meet with the appreciation of the telephone public as well as that of the whole staff.

## OBSERVATION.

THE subject of service observation, as Mr. OLDHAM well said in his article which we published last month, is a very extensive and important one and by no means to be exhausted in a single article; but one sentence in particular is worthy of remark, viz.: "It should always be remembered and realised by the operators that it is the *service* that is being observed and not the *servants*, the operating as distinguished from the operators."

To the rank and file of a large staff the obviousness of this truth is not perhaps so apparent as to the higher grades. Observations and service tests have often a vexatious aspect to the busy operator who does not always realise their immense value in feeling, as it were, the pulse of the service; and in some cases, perhaps, she suspects only a trap to catch her off her guard. We are sure, however, that every understanding and keen operator (the vast majority) can be convinced that all supervision and observation is intended for her assistance, for the perfecting of the service, and not for purposes of fault-finding; and we are equally sure that the vast majority of the supervising staff endeavour to make the operating staff feel this.

We have on a former occasion especially welcomed the formation of operators' telephone societies because we know that the individual operator has there such a unique opportunity of discussing and understanding the why and wherefore of proceedings and regulations which are often perplexing and incomprehensible to those who are ignorant of their basis and necessity. It is impossible to know the inner workings of individual minds, and the action and reaction of opinions of units of the staff one upon another; and such opinions have a great effect on the *morale* and efficiency of a staff. It is therefore an all-important matter to endeavour to set these opinions on sound and not on ignorant



foundations; for with a widespread soundness of view wonders can be effected. For this reason we are always glad to utilise in the JOURNAL any opportunity which may present itself to let in further light on operating (as on other matters) and to render, to all grades of the staff, their work more interesting, more intelligible and therefore more agreeable.

### HIC ET UBIQUE.

WE had thought that municipal telephony was about as dead as ping-pong. The analogy between the two diversions—for municipal telephony is a form of diversion for those who plunge into it—may be pressed further. Both had a sort of newspaper-excited vogue in the early nineteen-hundreds, and both were considerably deader than mutton in the course of three or four brief, exciting years. But there, unfortunately, the analogy ends, for whilst the ping-pong player scrapped his bats, celluloid balls, and little green baize tables at his own cost, the loss on the other game is being met by the taxpayer. Some extraordinary proposals as to the municipalisation of the telephone have been put forward in well-known quarters, and backed up by some of those fallacious facts and figures which are too well known to our readers to be sufficiently novel for animadversion on here.

A CORRESPONDENT sends us a paper called the *Canadian Gazette*, published in London, in which the following appears:—

We in London think ourselves fortunate in getting the telephone for £4 a year as subscription and 1d. per local call. The people of Port Arthur, Ontario, are rejoicing in a far better service for one dollar per year for private houses and two dollars for stores, and even at these low figures we read the telephones make a profit. Mr. Buxton is about to take over the National Telephone service. He had better send one of his smart young men to the Lake City to find out how much better they manage some things in Canada.

The paragraph is not important in itself, but it is typical of a certain kind of criticism. What is meant by a "far better service"? Why compare such a place with London in any respect or for any purpose whatever? The whole thing is so devoid of meaning, of detailed information and of all basis of intelligent comparison. As regards the sending out of smart young men we think the *Gazette* might send one to the London contract office to get a more exact idea of the London rates.

OUR Plymouth correspondent sends us the following example of twentieth century knowledge of telephones:—

Whilst pushing draw rods through certain conduits in Plymouth the Company's men were stopped by an apparently well-educated person, judging by his address, and asked what work was being carried out. Upon receiving the reply that it was in connection with the telephones, he said: "Oh, I suppose the hollow tube (referring to the hole in the draw rod) is the place through which the sound passes?"

This episode can be absolutely vouched for, and has not migrated from the "Plymouth" on the other side.

It has long been recognised, says a Glasgow correspondent, that contract officers, and particularly those of the feminine gender, have to face many trying situations and to answer many embarrassing questions. Hitherto these have been sprung upon them for the most part in the houses or offices of prospective subscribers, and they have been catalogued as all in the way of business and as part of the day's work. One can only imagine, therefore, the feelings of the lady who, on returning to the office, after a more or less successful day's work, is met by an anxious Contract Manager with the apparently impertinent query, "Well, have you had any proposals?"

MR. H. V. FOX sends the following explanation of the origin of the expression "O.K." from a *Scrapbook of Curious Facts*:—

More than a century ago the best tobacco and the best rum came from the Aux Cayes (pronounced O.K.), and the best of

everything was designated as Aux Cayes, or O.K. This meaning of the phrase is still retained.

In the Jackson campaign every lie that could be invented was invented to blacken the general's character, and an endorsement that he had made, "this is O.K." (meaning best), was taken by Seba Smith and declared by him to be but an abbreviation of the general's customary endorsement of papers as "oll kerrect."

The Democrats took up this statement and fastened the mystic letters to their banners. The meaning "all correct" stuck to the letters, and since then they have been used in the two meanings of "the best" and "all right."

### METHOD OF LOCATING AND REPAIRING FAULTS IN UNDERGROUND CABLE.

By J. W. WARNOCK, Assistant Engineer, Glasgow.

WITH reference to Mr. Gillmore's letter in the November issue of the JOURNAL, I give below some notes on troubles of the kind mentioned which we have experienced in Glasgow.

The use of the Silvertown test set for the locating of faults having been explained in O6 and U9, pages 7 and 8, I take it that Mr. Gillmore has seen to it that at least one of his staff has thorough mastery of it. If he has been fortunate enough not to have required to use it for the locating of faults, he would be well advised to connect up some leads, putting on faults (contacts, earths and S.C.), and locating the same with the Silvertown. In this manner he will make himself ready for the day, which I sincerely hope may be far distant, for him, when he will hear the alarming report, "such and such a cable has gone faulty." When he hears of such a case he should "hurry slowly," always remembering "the more haste the less speed." To some it may seem a great loss of time to spend from half to one hour getting a good wire in a roundabout way, and making the test; but it pays in the end, when you are able to walk to the place and say with almost absolute confidence that the fault is there. When you find it is there, you will be fully justified in spending the time.

When a cable breaks down, the greatest trouble is in getting a good wire for a return, and many a different expedient has to be adopted to get round the fault. The following are some of the methods which, to my knowledge, have been used:—

No. 1 was the case of an aerial cable which was faulty

- (a) between B and E, also
- (b) between B and F.

(a) A spare cable wire was used from A to B, and spare open wire between B and E, which was connected on to a faulty wire between A and E and then test taken. Result worked out to 700 yards from "A." A test (cond res.) was taken from A to B, which gave a result of 500 yards; 400 yards were then stepped from B towards E and the fault was at once discovered.

(b) The same spare wire was used between A and B, but as no spare wire existed between B and F a working open circuit was temporarily cut out and line used. The fault was tested to be 1,300 yards. When the 1,000 yards were stepped out it came to a point about 15 yards past the pole where the fault was.

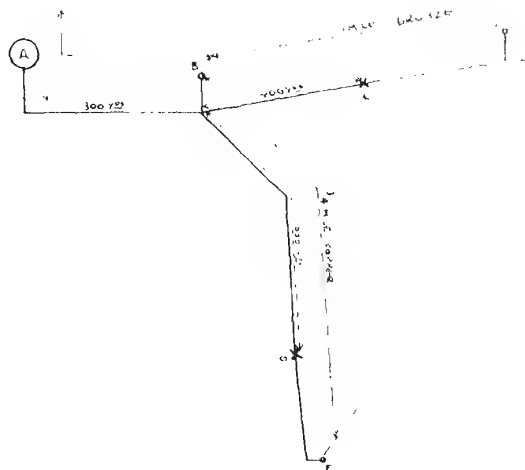
No. 2 was a case where the shunt "B.C." was low in insulation and a sufficient good wire could not be got to permit of a test being made. A spare cable wire was used from A to D joined on to a spare open wire D to C which was connected to the lowest wire between A and C. The test was taken and the fault located to be in duct under car rails. This section was cut out on a Saturday afternoon which made things "O.K."

No. 3 was a case where the whole cable was damp and it was not convenient to get a good return without opening another cable. The faulty cable as well as an "O.K." one was opened at point "B," a wire in each was picked up and the test made. When the cable diagram 8,973 was consulted the fault was seen to be between C and D manholes. The joints on faulty cable in these manholes were opened and the fault still being tested between, a V.I.R. lead was run along the ground to allow of another test being made which

gave the exact position of fault. The ground was opened about two yards beyond this from the nearest manhole and the faulty section cut out.

The above gives different methods of getting round the fault with a good return but it is impossible to set down a definite rule, and each case must be taken on its merits.

As to the repairing of faults after location, if the dampness has been arrested before travelling far into the cable the fault can be cleared by removing the lead sheath or sleeve and drying the cable out by means of blow lamps. If the dampness has travelled



along the cable it will be found better to open the cable about two yards further on and, if now past the dampness, to cut that piece out and get rid of all the trouble.

As to temporary means it is generally rather difficult to get an alternative route, and the fault in the cable can be cleared as soon as, if not sooner than, the temporary measures can be brought into use. Therefore it does not seem expedient to trouble about temporary arrangements unless the fault is of such a nature or in such a place that it is not convenient to have the trouble removed at once. What to do in such a case can only be answered definitely with a full local knowledge of the whole circumstances.

#### PREMIUMS FOR TELEPHONE SOCIETIES' PAPERS.— SESSION 1909-10.

At the commencement of the Bristol District Telephone Society meeting on Nov. 17, 1910, Mr. R. A. Dalzell, Provincial Superintendent, presented two cheques to Messrs. W. W. Roberts, Local Manager, Brighton, and Mr. A. E. Coombs, Traffic Manager, Bristol, for their prize papers on "Development" and "Traffic" respectively. Mr. Dalzell, in a few well-chosen remarks, referred to the pleasure it afforded him in having the opportunity of awarding these cheques, and also at having been privileged to hear each of the papers read by the winners.

Mr. Roberts and Mr. Coombs suitably responded.

#### AWARDS MADE FOR SUGGESTIONS, ETC.

We publish the list of awards made by the Education Committee for useful inventions and suggestions made by the staff. It will be noticed that a lady's name, that of Miss E. K. Reynolds, of Bolton, appears in the list for the first time:—

	£	s.	d.
R. S. Kirkwood, Glasgow, work order cost slip .. .. .	2	0	0
T. R. Rawlings, Bristol, valued call sheets .. .. .	2	0	0
G. H. Carrier, Birmingham, table of practical approximate weights of varying lengths of wire .. .. .	2	0	0
B. Murphy, Dublin, subscriber's fault card .. .. .	2	0	0
H. R. Hircoe, Hull, rate demand note book .. .. .	2	0	0
J. M. Anderson, Glasgow, sorting frame for tickets .. .. .	2	0	0
A. R. Fraser, Head Office, instrument for measuring electrostatic capacity .. .. .	0	10	0
H. C. May, Head Office, instrument for measuring electrostatic capacity .. .. .	0	10	0
H. Hutton, Brighton, box for insulating tape .. .. .	2	0	0
J. Cree, London, ready reckoner for resistances .. .. .	2	0	0
J. A. Millett, Reading, night bell contacts on Ericsson switchboards .. .. .	2	0	0
F. Michaelson, Manchester, improvement of O. W. key tops .. .. .	2	0	0
R. Meredith, London, cross talk test .. .. .	2	0	0
P. Swan, London, convertible C.B. and L.B. electrophone table .. .. .	2	0	0
W. H. Cooke, Cardiff, carbon block terminal .. .. .	2	0	0
F. C. Scannell, Dublin, circuit for flashing "A" operators' supervisory signals .. .. .	2	0	0
E. Spargo, Liverpool, fitting of pulls on plugs .. .. .	2	0	0
E. Harper, Southampton, modification of wire wrapping tools .. .. .	2	0	0
Miss E. K. Reynolds, Bolton, linen pad to protect operators' clothing from transmitters .. .. .	2	0	0
H. Ross, London, alteration to C.B. switchboard plugs .. .. .	2	0	0
C. G. Barker, Head Office, local line allowances .. .. .	2	0	0
new method of splitting up route into two types of cable .. .. .	2	0	0
G. Dale, Gloucester, alteration to jointing clamp .. .. .	2	0	0
W. Martin, London, make off of steel suspender enclosed in cable .. .. .	2	0	0
J. O. Robertson, London, revised works order .. .. .	2	0	0

#### Grants to Local Telephone Societies.

Greenock .. .. .	4	0	0
Paisley .. .. .	4	0	0
Newcastle .. .. .	4	10	0
Sunderland and South Shields .. .. .	4	7	0
Hull .. .. .	4	11	0
Leeds .. .. .	4	6	0
Bradford .. .. .	3	15	0
Blackburn .. .. .	5	0	0
Bolton .. .. .	5	0	0
Warrington .. .. .	5	0	0
Liverpool and Birkenhead .. .. .	4	17	0
.. .. . Operators .. .. .	5	0	0
Chester .. .. .	4	1	0
Nottingham .. .. .	4	9	0
Leicester .. .. .	4	0	0
Birmingham .. .. .	4	10	0
.. .. . Operators .. .. .	4	10	0
Wolverhampton .. .. .	4	15	0
Northampton .. .. .	4	3	0
Brighton .. .. .	4	3	0
Hastings and Eastbourne .. .. .	4	5	0
Dover .. .. .	4	5	0
Tunbridge Wells .. .. .	3	6	0
Cardiff .. .. .	4	5	0
.. .. . Operators .. .. .	4	12	0
Exeter .. .. .	4	16	0
Gloucester .. .. .	4	9	0
Cheltenham .. .. .	5	0	0
London .. .. .	3	6	0
.. .. . (Western) .. .. .	3	14	0
.. .. . (Southern) .. .. .	3	3	0
.. .. . (North Eastern) .. .. .	3	18	0
Dublin .. .. .	3	12	0
Notis Factory .. .. .	5	0	0
Cork .. .. .	1	7	0
Sheffield .. .. .	4	9	0
Oldham .. .. .	3	17	0
Luton .. .. .	4	10	0
Hanley .. .. .	3	17	0
Weymouth .. .. .	4	2	0
Dundee .. .. .	4	5	0
Truro .. .. .	5	0	0

#### Awards for obtaining Medals

F. Bastow, Bradford, for obtaining silver medal .. .. .	4	0	0
F. W. Friday, Head Office, for obtaining silver medal .. .. .	4	0	0
R. Mentast, Manchester, for obtaining bronze medal .. .. .	3	0	0
W. K. Ward, London, for obtaining bronze medal .. .. .	3	0	0

**AUTOMATIC versus MANUAL SWITCHBOARDS.**

By JOHN J. CARTY, *Chief Engineer American Telephone and Telegraph Company.*

(Concluded from page 170.)

We already have an effective long distance service through underground cables of the Pupin type from New York to Philadelphia (90 miles), and good talking with prompt connections is an everyday matter between New York and Boston (235 miles). Our long distance wires extend to Chicago and other more distant western cities, and to Washington, Baltimore, Atlanta and other places in the far south. At the present time we are extending an underground cable of the Pupin type from New York to Washington (235 miles), and are making surveys and plans for an extension from New York to Boston. More than this, by the adoption of phantom loaded overhead circuits between New York and Chicago, and by similar extensions westward as far as Omaha, and thence to the Rocky Mountains, we expect by Jan. 1 next to have so greatly extended our "long distance" frontier that conversation may be held between Denver, Colo., and New York City, a distance of 2,200 miles.

I have mentioned these things to give a suggestion of the intricacy and magnitude of the system for which switchboards must be provided and to bring out strongly the point of view from which we must judge the capabilities of this so-called automatic system. Our problem is national, not parochial—it is indeed even international as your presence here to-day so eloquently testifies.

We must provide for the public a comprehensive system of which switchboards form only a part; and which shall be suitable not only for to-day, and for this year and for the next, but which shall be at its best obtainable efficiency during each period of its entire life. These things we must do if we are to avoid stupendous blunders and enormous reconstruction costs.

We must regard our growing plant as the landscape architect views the subject matter with which he works. He must plant his trees and shrubs not with a view to the immediate results, but he must have in mind the space which will be occupied, and the shape and character of his plantation as it grows to maturity. He must leave room for his trees to grow and must have in his mind at the beginning the total effect which he desires to produce. So it is with us. We must not install a system because of its fancied immediate attractiveness, if we can discern, by looking into the future, that its growth must be stunted and that it cannot survive the cold winters of practice. We are planning a magnificent park with its groves of trees and shrubs. We are not raising vegetables. We are planting avenues of oaks, not a bed of mushrooms.

It is with such thoughts as these that we have studied the question of different types of switchboards in America, and when thus considered, it is surprising to see how many of the features of the so-called automatic system fail to apply to the conditions of practice. Among these conditions with us is the necessity of providing private branch exchange service. This is done by locating at the subscriber's premises a switchboard provided with trunk lines extending to the central office and with a number of stations, sometimes a very large number, located in different parts of the subscriber's premises and connected with the P. B. Ex. Some of these private branch exchanges have as many as 1,200 stations connected with them. This number, however, is exceptional.

By means of this private branch exchange system a most satisfactory method of giving local connections throughout the different parts of the subscriber's premises is provided and from any of these stations by means of trunk lines to the central office, connection can be had to any other station in the entire telephone system, whether it be reached by local, suburban or long distance trunk lines.

Notwithstanding the work that has been done and all the claims that have been made, no practical way has been discovered for doing away with the operators at these private branch exchanges, and the outlook for a practical solution, meeting all of the plant, traffic and commercial requirements, is so discouraging that at the present time the best opinion is that nothing but failure in this respect is to be expected. It should not be understood that

at each of these P. B. Ex. switchboards there is an operator solely devoted to handling telephone calls. While this is the case in the larger installations, in the smaller ones, of which there are a very large number, the switchboard is operated by a clerk or someone who has also other duties to perform.

This P. B. Ex. development forms one of the most satisfactory and important features of the telephone in America. Some idea of its popularity and the magnitude which it has attained and is expected to attain will be gathered from the following figures:—In 1900, New York City had a total of 1,050 P. B. Ex. switchboards, located at subscribers' premises and serving 12,650 stations, connected with them. In 1910 there are 11,960 P. B. Ex. switchboards, to which there are connected 162,560 stations. In 1930, as a result of our studies of this subject, we are planning for 88,400 P. B. Ex. switchboards, having connected with them a total of 1,070,000 stations. These figures have a deep significance. They show that in the carrying out of plans upon which construction work is now being done that we shall reach a point where more than half of the stations connected with the New York City system would require to be handled by operators, even if automatic switchboards were installed at the central office. But more operators than these would be required in an automatic system applied to New York. Large numbers of toll operators and of long distance operators and monitor operators and operators for many other classes of service would be needed.

I have not before me a computation as to the total number which would be required in the system which we are planning, but some years ago a careful study was made with a view to seeing how far the automatic system might be advantageously used in New York City at that time. It was then found that counting P. B. Ex. operators and the central office operators, the so-called manual system would require 13,000 operators, and that in the so-called automatic system, leaving out of account the "mechanician operators," there would be required 10,000 operators.

We have studied this automatic system not only in connection with its application to large cities, but also when applied to an entire State. For this purpose a thorough study was made of the telephone system of the State of Connecticut. This study was made by a large staff of most competent engineers and consumed several months in the making. The result of this was to show that at the time the study was made, if we counted all of the private branch and other operators needed with the manual system, there was a total of 892 required. A similar careful study showed that if the automatic system were installed 600 operators would be needed, not counting the "mechanician operators."

All these things show that the automatic system, which has so many alluring features about it when its application to simple conditions is considered, becomes more and more unsuitable as the plant grows. Even when the automatic system is applied to the simple case of a single office district we have yet to find an instance in which the total annual charges lying against it are less than the manual.

I am aware that statements have been made by the partisans of the automatic system purporting to show that the annual charges on that system are much lower than on the manual. We have analysed the conditions of these cases and found the comparison was not made upon a fair basis. Where these automatic systems have been installed they have taken the place of obsolete or inefficient manual systems and the comparison has been made between an automatic switchboard of the most efficient type known and a manual switchboard of a very defective type. In some cases the comparison has been made between the best type of automatic and the very poorest known type of manual switchboard. It is not surprising, therefore, that from such comparisons figures could be obtained which would appear to favour the automatic. We have been at great pains and expense to make these comparisons on a proper basis and in a thorough and fair manner.

We have made studies in a number of cities in America, taking into account the factors of operating, maintenance, depreciation, taxes, insurance, and so forth. In every case we found that the annual charges were in favour of the so-called manual system.

I think enough has been said to show that the automatic system properly considered, does not do away with operators, does not operate without the constant surveillance of skilled mechanicians,



and that is in truth not an automatic system at all, but merely one form of semi-automatic system, of which the so-called manual is another.

By such considerations as these we are led to a point from which we can approach our subject with a mind freed from bias. By so doing we clearly see that we have not to do with a partisan controversy about manual switchboards *versus* automatic switchboards. We have before us a broad question in telephone engineering, requiring for its solution a clear apprehension of a host of subjects pertaining to the plant, traffic and commercial activities of the company or administration. It is a grave mistake to regard our problem as being one for the mechanic only; it is much broader and deeper than this, involving important questions of political economy.

Having stripped our question of its verbal disguise, we see that the two systems are not so antagonistic as would at first appear. They both stand upon this common ground: Each recognises the importance of manual operations guided by human intelligence; each recognises the importance of automatic machinery; each system employs both agencies; each system is semi-automatic.

We are now prepared to formulate the question anew. We see that it becomes a problem of dividing the total operations to be performed in such a manner that labour guided by human intelligence shall be employed where it is most effective, and that automatic machinery shall be employed where it is most effective. Properly stated, therefore, our question is, "What is the best type of semi-automatic switchboard?"

The so-called automatic system, as I have shown, is found unsuitable for the demands of a comprehensive system. The so-called manual system has been tested by the most severe demands of a system composed of 5,000,000 telephones, and it has been found to answer every substantial requirement. By its means we are to-day giving an excellent service, and our studies of the future requirements show that if nothing better is attainable we can, with the manual system, supply in a satisfactory manner all the demands of the public.

But it would not do for us to rest content with this; we must at all times strive for improvements. These are the traditions of the American Telephone and Telegraph Company, added to which are the specific orders from President Vail frequently reiterated, that we must constantly seek for improvements, so that we may at all times when it is reasonable and practicable place at the disposal of the public that system which solid experience has demonstrated to be the best.

Pursuant to this policy we have spent hundreds of thousands of dollars in experiments and investigations pertaining to this subject.

We have, after many years of work, developed and are now installing at New York for an experimental demonstration a system which is avowedly semi-automatic, and not disguised under another name. The advocates of this system contend that it is a mistake to place, as is done in the so-called automatic systems, complicated automatic machinery at each sub-station. (A sub-station is any telephone set at the subscriber's premises which may be connected to the central office.) They favour the use of a sub-station instrument identical with that employed in the so-called manual, and they assert that this instrument is really much more automatic than the instrument employed in the so-called automatic system itself.

We must admit that there is much force in this statement, for an analysis of the operation of the two instruments shows that the manual operations required at the automatic station are several times more numerous than at the manual station; in fact, all of the manual operations required at the manual station are also required at the automatic station. To these must be added at the automatic station a number of other manual acts, depending upon the character of the call to be sent.

It is further asserted that the apparatus at the automatic sub-station is complicated to a high degree, whereas at the manual station it consists of simple elements, and that in consequence of this, with the vast multiplication of stations which must take place in a successful telephone system, the automatic system would be placed at a great disadvantage.

In this semi-automatic system about which I am now talking a counterpart of the automatic apparatus which is required at each subscriber's station in the automatic system is placed at the

central office. Thus one of these pieces of apparatus is required for each "A" operator's position instead of one for each sub-station on the subscriber's premises. This greatly reduces the number of complications, and one of them being required for each operator's position only, much more money is available to be expended upon its construction. Hence it can be made with great precision and so as to give much more reliable working. Furthermore, these pieces of apparatus being at the central office, they are under the constant care of expert maintenance employees, who can instantly substitute a spare apparatus for one which should become defective.

It is contended on behalf of this semi-automatic system that the "A" operator's position (the "A" operator is the one who answers the subscriber in the first instance) is a point at which human intelligence is needed, because of the numerous exigencies of the service. I have carefully looked into this statement, and I am much impressed with the force of the reasons given in support of it. While the position of the "A" operator seems to be one where human intelligence is required, it is not so at the position of the "B" operator (the "B" operator is the one who receives the trunk call from an "A" operator at another office). When the work of this "B" operator is analysed it will be found theoretically that it can all be done by machinery, and that the work to be performed does not require human intelligence. Consequently, in this semi-automatic system, all of the "B" operators are eliminated and machines substituted. This very greatly reduces the total number of operators required, and if the machinery can be made to work satisfactorily it is believed that greater precision of working will be attained. This expectation is based upon statistics which show that a large part of the errors made at the central office take place between the "A" operator and the "B" operator.

As the pieces of automatic apparatus needed in the semi-automatic system at the "A" operators' positions in the central office are relatively small in number, it does not seriously increase the total expense to design and construct them with the greatest care and with the best workmanship, so that the utmost degree of precision may be obtained in their working. On account of the enormous number of such pieces of apparatus which would be required if they were distributed at the subscribers' premises, one for each telephone station as is required in the automatic system, the same high degree of design and workmanship cannot be applied, because the costs would be multiplied exceedingly. Hence in respect to these vital parts of the two systems the automatic system must always stand at a disadvantage.

The result of this has been to produce for the semi-automatic system an apparatus operated by a keyboard similar to that used on the typewriter. Working with such a keyboard, it has been experimentally demonstrated that the "A" operator can handle a very much greater number of calls than she could in the so-called manual system. This fact greatly reduces even the number of "A" operators.

The advocates of this system contend that they have made the best division of labour, the best distribution of automatic machinery, and that they can attain a higher degree of efficiency and much lower annual costs than are attainable with either the so-called manual system or the so-called automatic system.

Engaged upon this study and upon these experiments we have had a corps of capable engineers and experimentalists working for years, and I feel warranted in attaching great weight to their favourable expectations.

Soon after my return to America, I hope to be present at the opening of the semi-automatic switchboard, and until we have obtained the results of this working, there is not much more that I can profitably say upon the details of the subject.

In conclusion, the situation as I view it is as follows:—The so-called automatic system is not, in fact, automatic, it is only partly so. It has been fairly and exhaustively studied and found to be unsuitable for the comprehensive demands of our present service, and more and more unsuitable when considered with respect to the demands of the future.

The so-called manual system has successfully withstood the severe demands of a system comprehending 5,000,000 telephones and all of our careful studies with respect to future growth have shown that if nothing better were obtainable, it would furnish to us

a means whereby we could supply an excellent universal service to all the people of the United States.

As I have already stated, a third system, frankly called a semi-automatic system, is about to be practically tried. If the expectations regarding it are realised, it will be a system more efficient and more economical than either the so-called manual or the so-called automatic.

Before leaving this subject, I wish to speak briefly upon one point. It has been said by some that we have not generally adopted the so-called automatic system, because we have been deterred by the large expenditure of money which would be required.

I shall promptly show you that there is no truth in this. The history of the telephone in America has been that of rapid change from one system to another, as soon as improvements have been demonstrated. Pursuant to this policy, the plant at New York has been constructed and reconstructed three times. A similar story is to be told of the rest of the country. Our company has been so conservatively financed and our administration has been so keen to adopt new improvements, that ample depreciation funds have been accumulated so that just as soon as it is demonstrated that a better switchboard system is available, we are prepared to begin its installation and proceed with the utmost practicable speed to make the change. All of this could be done without the slightest disturbance in our financial arrangements.

While there rests upon us the responsibility of adopting as soon as it is practicable and reasonable to do so that which is best, there is a corresponding and most serious obligation of not throwing away what has been demonstrated to be a thoroughly efficient system, without having it conclusively demonstrated that there is something better. I do not see anything in the present state of affairs which need give any company or any administration any concern with respect to the possibilities of a sudden change, for even if it were demonstrated that a better system were now available, it would be impossible, taking into account the manufacturing and engineering resources of all the world, to make the change except in a gradual manner. We have already had so much experience with such changes that we know how they must take place. They are accomplished by a process of gradual evolution and not by sudden revolution.

In every administration there are from time to time switchboards which have been worked for the full period of their life. These must be replaced in any event, and when such cases arise the new type of switchboard is installed. This does not involve the abandonment of apparatus having further usefulness. There are also constantly arising cases where new installations must be made. These can be installed on the new plan. Obviously this does not require that any existing apparatus be thrown away. The manufacturers and the administration staffs would find themselves so fully occupied with this work that they would not for some years be able, even if it were desirable, to disturb those central offices in which the switchboards have many more years of life. It will be found that by the time the old switchboards have been replaced and the new ones installed those switchboards which have had to be removed in advance of the expiration of their life would be few, and in those cases the work would not be anticipated by a great many years. Even where a switchboard is removed before its life has expired, this need only be done when it is found best, all things considered, to replace it by a new one rather than to continue it in service. There is nothing in this situation which demands a headlong rush, so, without wasting any time, we should proceed with deliberate care.

We who are charged with the great responsibility of rendering such an important service to the public cannot be justly criticised if we refuse to be carried away by the enthusiasm of manufacturers and inventors, and thus to be led into a wholesale and probably disastrous experimentation upon the public.

In America we have pursued this subject for many years with the utmost diligence. An important practical demonstration is about to be made. We cannot foretell the answer, but we must accept it whatever it may be.

I have told some of the things we have done. It has been our constant aim to keep an open mind and to be free from bias. We are seeking only the truth, and from that we have nothing to fear.

## MEMORANDUM ON THE CONTINUED EMPLOYMENT OF THE COMPANY'S STAFF ON CONSTRUCTION WORK.

THE following memorandum was issued on Nov. 23 and has been circulated throughout all the offices and stores of the Company:—

In its memorandum of Feb. 1, 1909, the Company set out the difficulties experienced in the way of securing employment for its construction staff until the termination of the license, and since that date negotiations with the Post Office have been continued but the result has not enabled capital expenditure to proceed in such a way as to provide either for a normal development of the system or for a full employment of the staff.

Following upon this result the Company has reviewed the position with a view to ascertaining if any modification of its present and future policy could be adopted which would obviate the necessity for further dismissals.

The policy which the Company had proposed to adopt would have necessitated the cessation of canvassing for new business during some portion of the year 1911, thus entailing further dismissals of staff. In view, however, of the undoubted hardship such a course would involve, the Board has now agreed to modify that policy so as to continue canvassing and consequent development of existing plant for a later period than was previously contemplated. The result of this decision enables the Company, subject to the existing conditions of the service, to state that unless unforeseen circumstances arise it will be able to retain its existing staff (including construction staff) until the end of the license.

GEORGE FRANKLIN, President.

Telephone House, Victoria Embankment,  
London, E.C., Nov. 23, 1910.

## LONDON NOTES.

MR. A. E. ABBOTT, Exchange Manager, North, who has just been appointed Exchange Manager, Central Exchange, Birmingham, carries with him to the Midland capital the best wishes of his London colleagues, and their congratulations on his promotion. Mr. Abbott has been succeeded by Mr. J. A. Jenkins, promoted from Bank; while Mr. T. A. Beck, Assistant Exchange Manager, Gerrard, has been appointed to the Bank vacancy.

THE Contract Department has sustained a great loss by the death of Mr. W. H. Elkington, one of the City Contract Officers. Mr. Elkington had been in the service for about fifteen years. At his funeral the Company was represented by Mr. Nicholls, Acting Contract Manager; Mr. Bigland, Divisional Contract Agent, City; and Mr. Culpin, Chief Clerk, City Contract Office. Wreaths were sent by the Company and the contract staff.

THE presence of Mr. Franklin, the President of the Company, added considerable interest to the November meeting of the London Telephone Society. Mr. Franklin's main object was to present the premiums awarded by the Education Committee for successful papers to those members of the Head Office and Metropolitan staffs who were amongst the prize winners. Cheques were also handed to two young men—one from the Engineer-in-Chief's office and the other from the Metropolitan staff—who had gained medals in recent technical examinations. In his preliminary remarks the President took occasion to express the interest with which the Board had followed the development of telephone societies, and had recognised the great influence they were exercising amongst the staff in promoting the study of telephone science. Afterwards, in acknowledging a vote of thanks, proposed by Mr. Clay, Mr. Franklin referred in very eloquent terms to the importance of technical education and the part which it necessarily plays in mental equipment. The whole function passed off very happily and successfully. Following the more ceremonial portion of the meeting, Mr. P. T. Wood read a paper on the "Work of the Electrical Department in London—what it had achieved and what it sought to attain." The paper was a composite one, Messrs. Greenham, Kidd and Wright having been co-authors with Mr. Wood. Several interesting points, dealing with such questions as costs of maintenance and fitting, reciprocal working with other departments, analysis of faults, completion of works orders, and inspection of C.B. instruments were brought out. Considering that many of them had been hurriedly prepared, the illustrative slides were very good. The subsequent discussion was short, but not without animation.

WITH a view to interesting those members of the staff who come most in contact with the public in the electrophone, a series of special "hearings" was arranged. Three were held during November, there being about 25 present in the electrophone reception-room on each occasion. Mr. Booth, the Electrophone



W. H. ELKINGTON

Company's Manager; Mr. Greenham, Metropolitan Electrician; and Mr. Pattman, the Company's Officer-in-Charge, spoke at one or other of the gatherings. It is desired to encourage the use of the electrophone by subscribers, and as a commission is paid on all orders secured by the staff, it is hoped that increased business may result. Not only contract officers but inspectors and fitters might be able to do something.

The annual meeting of the Provident Club was held on Nov. 18. Owing to inventory work having necessitated the departure of both secretary and treasurer new officers had to be found. Mr. Harvey Lowe consented to act as treasurer, and Mr. J. Burrell was appointed secretary, with Mr. H. E. Bailey as assistant. The club has been very prosperous during 1910, there having been an increase of nearly 50 per cent. in the membership. The new season starts on Dec. 3, 1910, and no member of the staff who requires a little extra income in time of sickness should fail to join.

Two very interesting papers were read at the second meeting of the Telephone Operators' Society on Nov. 16 (at which, by the way, there was an attendance of 231), both provocative of much discussion; and, indeed, the points raised were so many that an evening might well have been devoted to each of them. The first, by Mr. Webb, Assistant Exchange Manager, London Wall, was on "Distribution," in which, perhaps, the most interesting feature was the striking way in which the amount of information now available as to the traffic on the various subscribers' lines, and the use made of it in apportioning the operators' loads, were demonstrated. The second, by Miss Godden, Operator at Avenue Exchange, was on "Catering." This paper, on a subject which by some might be considered beneath the dignity of a telephone society, gave ample and, to some extent, quite unexpected evidence of the important part which such matters bear in the life of the operators. The preparation of the daily menu, the management of the finance, the care for the general comfort of the operators, and even the vagaries of the inevitable grumbler, were all discussed. The debate which followed was almost entirely in the hands of the ladies, and was enlivened with many humorous anecdotes and interesting experiences illustrating the many-sided nature of a caterer's duties.

THE next meeting of the London Telephone Operators' Society will be held on Dec. 12, when debates will take place on the following subjects:—"Are Speed of Answer Tests Useful?" and "The Method of Answering Originating Calls." As these are the first debates arranged by the society it is hoped that all members will attend so as to ensure a successful evening.

### GLASGOW NOTES.

PRIOR to the ordinary meeting of the telephone society on Nov. 9, an interesting function took place. In the Head Office premium competition for the session 1909-1910 Glasgow was fortunate enough to secure two first prizes and one second, these falling to members who had read papers before the society last session. The General Superintendent decided to make the presentation of the prizes in person, and only at the last moment did he find himself unable to travel north. He requested the Superintendent for Scotland to take his place, and Mr. Watson discharged the duty in a very happy fashion. He read a letter from Mr. Goddard, expressing regret at his enforced absence owing to ill-health, and complimenting the Glasgow Society in flattering terms. Mr. Watson also expressed his own gratification and that of the Glasgow management that such a satisfactory proportion of the premiums had been awarded to members of the Glasgow staff.

The ordinary meeting was thereafter proceeded with, four papers being read by prize winners in a local competition confined to members of the minor staff. These were "The Perfect Cash Clerk," by Mr. D. B. Heberton; "An Ideal Apprenticeship," by Mr. W. Inglis; "The Stores," by Mr. A. C. Thomson; and "The Telephone Receiver," by Mr. J. T. Hutchison. All the papers were of an interesting nature and were read to an appreciative audience.

The National Telephone Operators' Society and Club, Session 1910-11. On Nov. 14 the second meeting of the current session was held. On this occasion two most interesting papers were read, both by ladies. The first, entitled "Experiences of a Lady Contract Officer," was submitted by Miss McIntosh, Chief Lady Contract Officer, Glasgow. The second paper, giving the "Experiences of a Call Office Operator," was by Miss B. Gray, Operator, Royal Exchange, Glasgow. In both papers the school of experience brought to light much that was instructive and amusing, and that the papers were greatly appreciated was evident from the heartiness of the vote of thanks accorded both ladies.

The social part of the evening was entered into with the usual vim and a most enjoyable evening passed all too quickly.

A special feature of this year's meetings is the presentation each evening of punctuality prizes; one prize is given by the society, and at the past two meetings, another prize has been given by a member. The lucky recipients at the first meeting of the session were Miss Agnes Ray, Argyle Exchange, and Miss Finlayson, Royal Exchange, and at the second meeting, Miss S. Slater, Royal Exchange, and Miss I. Murray, Langside Exchange.

THE unification of the Post Office and National services here proceeds apace, and work in connection with the transfer of a large body of subscribers from the Company's Royal Exchange to the Departments Central Exchange is at present in hand. One hundred and forty D.P. points are involved, to each of which the Post Office are laying underground circuits for the use of the Company. The transfer is expected to take place on Jan. 1, and a good deal of work remains to be done prior to that date.

THE staff of Argyle Exchange and friends held their annual "At Home" in the Prince of Wales Halls on Nov. 12. About 75 couples were present, amongst

whom were Mr. Rodger (Traffic Manager) and Mrs. Rodger. A most enjoyable evening was spent.

*Belt Golf Club.*—The annual general meeting was held on Oct. 21. In the absence of Mr. R. F. Kirkwood on inventory duty, Mr. G. Martin, the vice-captain, occupied the chair. The rules were revised and the following office-bearers elected for the ensuing year:—

Mr. G. Martin .. ..	Captain.
Mr. A. S. Duncan .. ..	Vice-captain.
Mr. D. B. Heberton .. ..	Secretary and treasurer.

These three together with Messrs. A. C. Thomson and J. F. Murray form the committee.

*National Telephone Bowling Club.*—The annual presentation of prizes of the above club took the form of a smoker, held in "The Grill," West Nile Street, on Nov. 28. The president, Mr. W. Fursman, occupied the chair and was supported by, amongst others, Messrs. G. Johnstone, James Forrester, J. W. McDonald, and John Johnstone (secretary, Cowlares Bowling Club). There was a very large attendance, including representatives from Cowlares, Gartloch, Queen's Park, Victoria and Post Office Bowling Clubs.

The prize winners are: Champion, Mr. W. Stewart (Engineer's); pairs game, Messrs. T. Curr and F. Springer; rink game, first, Messrs. W. S. Mackie, A. Blair, R. Brown and W. Fursman; second, Messrs. W. Wright, J. McMeeking, H. Sutherland and J. Kennedy.

The musical arrangements reflected great credit upon Mr. Charles Ferguson who was in charge, and amongst those contributing to the harmony of the evening were Messrs. Robertson, Sutherland, Paton, Gordon, McMillan, Biggs, Drysdale and others, and Mr. Fred Murdoch ably presided at the piano.

The annual business meeting of the club will take place early in April, 1911.

### CORRESPONDENCE.

#### DISTRICT OFFICE STORES BOOKKEEPING. TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

FROM the figures given by Mr. Thrush in the November JOURNAL it would seem that a great improvement was necessary, which he is to be congratulated on effecting.

It is safe to say he is not satisfied with the position attained and acquired, for dissatisfaction is one of the features of enthusiasm.

In size Mid-Yorks district will much exceed that of West Kent with proportionate bookings, yet the average of 3s. 8d. per station (material 2s. 1d., tools 1s. 7d.) is not low water mark, especially in the tools a/c., whilst the gross stock difference of £10 13s., and nett of £2 15s. is no improvement on recent years, and is capable of betterment.

Given an energetic stores clerk and painstaking storekeepers material should be kept as correctly as cash.

The trouble is in the out-centres. The storekeepers at these are mostly out of touch with the office, except through the medium of correspondence: they have fewer qualifications than are possessed by storekeepers at the larger centres and have insufficient work at the stores to occupy the whole of their time. Their ability to grasp instructions, to initiate and carry out plans for progress, to control men and material, is thus limited.

The cure is the enlargement of the personal oversight of the office, as set forth in the latter part of an article which appeared in the August, 1908, JOURNAL.

The close scrutiny of requisitions and comparison with records, which of necessity cannot be kept daily up to date, the frequent striking of fresh prices, the monthly checking of stores postings, are all valuable aids to correctness. Happy should the district be that has the time to devote to all these.

The control of requisitions is the key of stock control. It is to be regretted that in the latest issue of S.I.B. the instruction to "show in proper column of requisition the quantity in stock and on requisition undelivered" has been omitted. The obligation to supply is thereby weakened.

This method is to be preferred over the "maximum" and "minimum." The figures for these latter can only be approximated, and give no clue as to correctness of stock. Besides, with the monthly system in vogue, it is only possible for the office to know the exact position once a month, i.e., ten to fifteen days after the close of each month, by which time large additions or reductions may have taken place.

Where there are storekeepers it is advisable for each of these to estimate and requisition for three months' requirement of small articles, supplying the sub-centres by means of inspectors' visits. Stocking and despatching by the largest stores means cost in packing and conveyance.

The importance of stores work cannot be over-emphasised. It is a fruitful field for efficiency and economy.

Leeds, Nov. 11

G. H. SARGEANT.

#### "THE TELEPHONE LOAD LINE."

##### TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH further reference to Mr. Deane's paper in the June, July and August JOURNALS and also to Mr. C. H. Toms' letter which appeared in the November JOURNAL, there are a few points with regard to both of these which I think require a little further discussion.

As Mr. Toms' letter deals with some of the controversial paragraphs, I propose taking the various points *seriatim*, omitting only such as call for no comment or are self-evident.

*Item 2.*—The point of the remark is not quite clear. Does this rather not confirm Mr. Deane's statement referred to—as the fact of operators taking holidays in slack time does not affect the volume of traffic dealt with?

*Item 3.*—I cannot agree that it would pay to take peg counts once a month at all exchanges of over 300 lines. Only at the larger exchanges, say those with



1,500 lines and over, and at the smaller exchanges, where there is rapid traffic development, would it be profitable to take such monthly peg counts? With regard to the date on which the counts should be taken, would it not be better to specify a week during which these have to be taken and then rely on the local traffic staff to select a day in that week which would be representative of average conditions.

Item 4.—I agree with Mr. Toms here. It is very difficult quite apart from the principle involved—to credit operators with the operating they do.

Item 6.—I think it was apparent from Mr. Deane's paper that these figures were intended to show the average conditions in London, and as such they could not be adopted in the provinces without due discrimination and the consideration of local conditions. The conditions under which the London service is carried on make these valuations more or less local to London, but at the same time they serve as a very useful guide to others who may be studying the question.

Item 7.—Where I think the difference comes in, is in the wrong time values being given to local calls by Mr. Deane, and consequently the busy seconds in the operators' hours are under estimated. It would, I think, be agreed that if junction operating could be eliminated on any one of our C.B.I. exchanges the operators would comfortably handle an average of 250 actual calls in the hour. It is perfectly true as Mr. Deane points out (p. 72, paragraphs 2 and 3) that the tendency of local call time values is to increase rather than to decrease, such increase being due—apart from the increased reach—to the joining up of different classes of service, which necessitate more detailed attention on the operators' part.

Item 8.—I think both the figures of Mr. Deane and Mr. Toms may be improved upon with regard to C.B.I. exchanges. The normal B.H. load at Bristol is 240 valued calls, with an average service of ten seconds—five seconds call, five seconds clear. The valuation of calls and proportion of various classes of service, junction work, etc., of course have a bearing on this, but given correct valuations a 240 standard, in so far as value is concerned, should be easy of attainment.

Item 9.—I agree with Mr. Toms.

Item 10.—Would not a "demand" for a repetition be made by the "B" operators' silence? This at least is what was understood.

Item 11.—There does not appear to be any difficulty in travelling from one curve to the other, and the curve as plotted by Mr. Deane appears to be very useful.

Item 14.—It was of course understood that this was an average curve, and applicable to local conditions only—this could hardly be otherwise for "B" operators—but the curve is useful as guide upon which to base other curves.

Item 15.—It is of course understood that the staffing of an exchange is not worked out from average figures in this way. This was, I think, clearly indicated by Mr. Deane (page 90, paragraphs 2 and 3). The figures quoted in table G were merely deductions from previous figures of actual conditions.

Item 16.—I do not agree with Mr. Toms that the principle of making divisions self-supporting is generally obtained at the expense of an increase in operators, this has not been found to be the case in practice; it does not follow that because there are six divisions in an exchange the operators should be brought in in sixes, or multiples of six, at the various duty times. Are not the total number of operators required per half hour first decided upon, then such total made up by a proportionate number from each division? The principle of self-supporting divisions is, in my opinion, a very excellent one, and should be carried out as far as it fits in with economical staffing. The suggestions made by Mr. Toms certainly would not tend to co operation, but to constant friction.

Page 72, paragraph 2. I do not agree with Mr. Deane that it is wrong reasoning to assume that other things remaining equal, the operators' load should never be increased, apart from a decrease in the time value of the local call. He appears to make no allowance for increased efficiency of the staff, enabling them to reduce the "idle" time referred to at the foot of page 71.

Bristol, Nov. 18.

N. B. NOBLE, Exchange Manager.

#### TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I have read Mr. Deane's paper with much interest; he has certainly dealt in a very able manner with a difficult and complicated problem.

On one point I should like a little further information.

On page 40, paragraph 4, Mr. Deane, in the phrase "we must also know the actual time value of our unit, the local call," suggests that there is something which he has not got, and this something seems to be reflected in the time values quoted for local calls on page 48, table "B."

If the average time valuation of a local call at C.B.I. exchanges is 11.42 seconds (per Mr. Deane) and an "A" operator at such exchanges is assumed to be fully loaded when she is dealing with 220 of such calls during the busy hour, it will be found that such operator is engaged 2,512 seconds only (11.42 by 220) during the hour. As there are 3,600 seconds in an hour, this would leave a margin of 1,088 seconds (or approximately eighteen minutes) unaccounted for.

It can hardly be the case, however, that these operators are idle eighteen minutes out of 60 unless one of three things has happened—

- (1) The operators are not fully loaded.
- (2) The operators spend too much time on matters not directly concerned with operating.
- (3) The time values are too low.

I am inclined to the opinion that the latter is the case, for as a result of investigations at Bristol (which is a C.B.I. exchange) the following figures have been obtained:—

Average time valuation of		Average value of junction	
Local calls	Junction calls.	calls in terms of local	calls.
13.09 seconds.	20.62 seconds.		1.57 seconds.

The normal busy hour load at Bristol is 240 valued calls, therefore the Bristol "A" operators are engaged, according to the above valuation, 3,142 out of 3,600 seconds per busy hour, in other words, 52.4 minutes out of 60. This would appear to be much nearer the actual condition of things than the figures given by Mr. Deane.

Did Mr. Deane's observations cover the various services, such as flat, measured, call office, money box, etc., in the proportion of their originating calls at each exchange? If the correct proportion of the difficult calls referred to at the bottom of page 48 has not been obtained the figure of 11.42 would not be representative, for of course the valuation of calls depends not only on the apparatus and junction traffic, but on the proportion of the various classes of calls according to service.

Bristol, Nov. 18.

A. E. COOMES, Traffic Manager.

#### NEWS OF THE STAFF.

Mr. E. J. JARRETT, Local Manager, Wolverhampton, on being transferred to the Inventory staff, was presented with a kit bag and pair of military hair brushes.

Mr. DUNN, Local Manager, Worcester, who has been transferred to the Inventory staff, was presented with a kit bag and pipe.

Mr. R. ATTLEY, Local Manager, Paisley, was presented with a handsome travelling rug on the occasion of his transfer to the Inventory staff.

Mr. Wm. McPHAIL, Assistant Engineer, Paisley, was presented with a dressing case on the occasion of his transfer to the Inventory staff.

Mr. W. E. WATSON, Chief Electrician, Plymouth, has been appointed Lecturer in Telephony and Telegraphy at Plymouth Technical Schools in connection with the evening classes.

Mr. F. J. HALL, Sub Engineer, Bristol, has been appointed to the Inventory staff. Prior to leaving Bristol he was presented by his colleagues on the engineering staff with a handsome silver-mounted umbrella as a mark of esteem.

Mr. R. K. KEEL, M.Sc.Tech. Assoc. M.S.T., Traffic Department, Manchester, has been promoted to a position on the Engineer in Chief's staff. On leaving the district he was presented with a gold Albert by the members of the staff.

Mr. G. S. PORTER, of the electrical staff, Edinburgh, on the occasion of his leaving the service, was presented with a gold chain. He sails shortly for New Zealand, where he intends going in for farming.

Mr. G. F. POPE, Engineering Inspector, Coventry, has been promoted to Inspector in Charge at Leamington.

Mr. T. W. WICKHAM, Exchange Electrician, Central Exchange, has been appointed Exchange Manager, Liscard Exchange.

Mr. F. C. BURSTALL, Exchange Manager's Clerk, has been appointed Assistant Exchange Manager, Central Exchange.

Mr. F. W. A. CLUTTERBUCK, Exchange Manager in Training, Bristol, who has been appointed to the Inventory staff, was before leaving Bristol presented by his colleagues on the traffic staff with a handsome silver mounted walking stick as a token of esteem.

During the absence of the Chief Clerk, District Engineer and Chief Test Clerk from the Birmingham district on the Inventory staff, the following members have been appointed to act in their stead respectively:—Mr. H. G. SAVAGE, Mr. H. P. LLOYD and Mr. S. LAMBERT.

Mr. L. R. WALLER, of the Engineer-in-Chief's Department, Nottingham Factory, was the recipient of a handsome kit bag and travelling rug on the occasion of his leaving the service to take up an appointment in Odessa. Mr. J. W. BRIGGS made the presentation on behalf of the combined staffs of the Engineer-in-Chief and Factory Manager.

Mr. E. H. MORGAN, Bank Exchange, on his departure for Canada, was presented with a "Thermos flask" and fountain pen on the eve of his departure to Canada. Mr. J. O. COOPER made the presentation on behalf of the operating and electrical staffs, a large number of whom were present to wish Mr. Morgan success in his new sphere.

Miss ELSIE P. E. LAING, Operator at the Broomhill Exchange, Sheffield, resigned from the Company's service on Oct. 27.

Mr. F. H. CHAPLIN, Clerk, Brighton, has been transferred to Liverpool.

Mr. BERRIAM WATERS, Inspector, Brighton, has been transferred to Ipswich.

Mr. FREDERICK W. JACKSON, Fitter, Brighton, has been transferred to London.

Mr. T. WILLIAMS, Cashier, Brighton, has been transferred to Guildford temporarily as Chief Clerk, during the absence of Guildford Chief Clerk on Inventory work.

Miss SARAH JANE JONES, Operator, Central Exchange, Swansea, who has resigned the Company's service, was, on leaving, presented by the members of the operating staff with a writing desk as a mark of esteem.

Miss MABEL A. BALMOROTH, Senior Operator, Batley, who entered the Company's service Jan. 1, 1898, resigned on Oct. 14, 1910, owing, unfortunately, to ill-health.

Mr. F. COLE, Inspector, Eastbourne, was, on the occasion of his transfer to Bath as Inspector, presented by the staff with a Gladstone bag.

Mr. B. STRIDWICK, Inspector, Eastbourne, was the recipient of a similar present on the occasion of his transfer to Birmingham as fitter. Mr. R. CURLING (Local Manager) made both the presentations.

Miss NELLIE BRADSHAW, Supervisor, Nottingham, has been appointed Travelling Supervisor.

Miss POLLY LEVENTON, Operator, Nottingham, has been appointed Supervisor.

Miss ELSIE RILEY, Operator, Whitchurch, left the Company's service on Oct. 28 on account of ill-health. The operating staff in the Cardiff centre have presented her with an ebony-backed brush and comb as a mark of esteem and with sincerest wishes for her speedy recovery to health.

## METROPOLITAN STAFF CHANGES.

Mr. S. LAUGHTON, Private Branch Exchange Operator, to be Contract Officer, City.

Mr. J. E. R. HARRISON, Wayleave Officer, North, to be Contract Officer, East.

Mr. W. HOLLAND, Clerk, Divisional Constructional Electrician's Office, South East, to be Fitter, City.

Mr. F. P. HOLMES, Night Operator, Bank, to be Contract Officer, Hop.

Mr. F. G. LEWIS, Test Clerk, Hop, to be Inspector, Hop.

Mr. J. C. FULLER, Inspector, Kensington, to be Clerk, Electrophone Department.

Mr. E. H. NICHOLS, Inspector, Bromley, to be Assistant Engineer, Metropolitan Engineer's Office.

Mr. J. T. LEETE, Assistant Engineer, Hop, to be Assistant Engineer, Metropolitan Engineer's Office.

Mr. C. ROBERTSON, Apprentice, to be Assistant Exchange Manager, Avenue.

Mr. ALBERT ABBOTT, Exchange Manager, North, has been promoted to be Exchange Manager of Central, Birmingham.

Mr. JAMES A. JENKINS, Exchange Manager, Bank, to be Exchange Manager, North. He was presented with silver-handled tea knives for the traffic and maintenance staffs at the Bank Exchange, who expressed their regret at losing him.

Mr. THOMAS BECK, Assistant Exchange Manager, Gerrard, has been made Exchange Manager, Bank.

Mr. THEODORE OLDHAM, Assistant Exchange Manager, Paddington, to be Assistant Exchange Manager, Holborn.

Mr. WALTER COLLIERSON, Assistant Exchange Manager, North, to be Assistant Exchange Manager, Paddington.

Miss HILDA LITTLE, Supervisor, Gerrard, to be Supervisor-in-Charge, Richmond.

Miss ANNIE GIFFORD, Supervisor-in-Charge, Richmond, to be Supervisor, Gerrard.

Miss LOUISE SPENCER, Operator, Walthamstow, to be Supervisor, Operating School.

Miss SARAH KEYS, Operator, Bank, to be Supervisor, London Wall.

Miss ADA ROBERTS, Operator, East, to be Supervisor, London Wall.

Miss LOUISA REID, Exchange Clerk, Dalston, to be Exchange Clerk, London Wall.

## MARRIAGES.

Mr. S. C. SMITH, District Manager, Maidstone, was married to Miss AGNES JENNINGS at St. Mary Abbot's Church, Kensington, W., on Nov. 14.

Mr. HAROLD WATSON, Rental Clerk, Hull, was presented by the staff with a dinner and tea service, as a mark of their esteem, on the occasion of his recent marriage.

Mr. W. DALTON, Local Manager, Walsall, was presented with a reading lamp on the occasion of his recent marriage.

Mr. W. W. GOULD, District Office Clerk, was presented with a hall stand and dressing case on the occasion of his marriage. He has been transferred to the Inventory staff.

Miss DOROTHY L. DAVIS, Private Branch Exchange Operator (Imperial Tobacco Company), Bristol, has resigned to be married. Prior to her leaving, at a meeting of the operators' telephone society, Mr. Perkins, the District Manager, on behalf of the traffic staff, presented her with a handsome tea service as a mark of esteem. It is also pleasing to record that the Imperial Tobacco Company presented Miss Davis with a cheque for £2 2s. and that the W. D. & H. O. Wills' branch of the Imperial gave her a silver-backed mirror.

Miss GLADYS HUGHES, Operator, Hove, has left the service to be married.

Mr. H. SHEPHERD, Nottingham Factory, was presented with a clock and a dinner service by the members of the Receiver and Cable Departments, Nottingham Factory, on the occasion of his wedding.

Miss IRENE T. HARRISON, Operator, Cardiff, left the Company's service on Oct. 20 in view of her approaching marriage. Prior to her leaving she was presented by the operating staff with an electro-plated cake basket as a mark of esteem and with best wishes for her future happiness.

Miss BEATRICE M. BROADBENT, Chief Operator, Stanningley, who joined the Company's service on Aug. 9, 1895, resigned on Aug. 18, 1910, to be married, and was presented with several personal presents from the members of the staff.

Miss ALICE BRAMLEY, Operator, Leeds Central, who joined the Company's service on Sept. 12, 1902, resigned on Oct. 6, 1910, to be married. She was presented by the staff with a silver cake stand.

Miss CLARA B. H. EVERETT resigned the Company's service on Nov. 3 to be married. Before leaving the operators held a high tea, whereat Miss Everett was presented with a Worcester trinket set.

Mr. S. R. HARRIS, Test Clerk, Plymouth, was presented by Mr. G. Hooper, District Manager, on behalf of the staff, with a handsome teapot, on the occasion of his recent marriage.

Miss IDA OVENS, Operator, Tottenham, on leaving to be married, was presented by the day and night operating staff and Maintenance Department with a silver-plated mounted bread platter.

Miss AMY BLYTON, Operator, Sutton-in-Ashfield, Notts, was presented with a trinket set and tea cosy by the Mansfield staff on the occasion of her marriage.

Miss EMILY MANEY, Travelling Supervisor for the Leeds district, who joined the Company's service on Feb. 24, 1899, and resigned on Sept. 8, 1910, to be married, was presented by the members of the staff with a clock and silver cake stand.

Miss CHARLOTTE BANKS, Supervisor, Operating School, London, on resigning her position on account of her approaching marriage, was presented by the Clerk-in-Charge and supervisors in that department with a Wedgwood and plated biscuit jar.

The marriage took place on Oct. 25 of Mr. ARTHUR CYRIL JENNINGS, A.M.I.E.E., of the Engineering Department of the Telephone Company of

Egypt, and Miss CLARE HAZEL MACKAY, daughter of Mr. and Mrs. Charles MacKay, of Port Elizabeth, Cape Colony. The civil ceremony at the British Consulate, Cairo, was followed by the religious rites at All Saint's Church, Cairo. The bridegroom will be remembered by many old colleagues in East Kent as having formerly been in the Company's service at Canterbury and Margate, whilst the bride's father is ex-mayor of Port Elizabeth, and unsuccessfully contested the Uitenhage Division for the seat in the first United South African Parliament in the Unionist interest. Mr. and Mrs. Jennings, who spent their honeymoon at Alexandria, were the recipients of many handsome presents.

## OBITUARY.

We regret to announce the death of Mr. JOSEPH ORR, Night Caretaker, Telephone House, Edinburgh. On Saturday, Nov. 12, he was suddenly taken ill whilst on duty, and had to be conveyed to the Royal Infirmary, where he died on the evening of the following Friday, the cause of death being ulcerated stomach. Mr. Orr, by reason of his quiet and kindly manner, had won favour with all members of the staff.

We regret also to record the death of EDWARD SIMON, Building Attendant, Liverpool, who was killed on Nov. 22 in a liftway of the Company's Exchange, South John Street, Liverpool. He had finished cleaning the lift and was ascending in it when he noticed some oil on the small window in the lift. He got off at the first floor for the purpose of cleaning the back of the window. The lift and balance weight cross each other in front of the window on the first floor, and about two feet above the sill is an iron cross-stay. Simon appears to have got off the top of the lift on to the window sill, and then instructed the lift attendant to bring the lift up a bit. Whilst this was being done, Simon by some means got struck by the ascending balance weight, and was jammed by the head between it and the cross-stay. When extricated, the unfortunate man was found to be dead, having sustained a fracture of the skull.

## LOCAL TELEPHONE SOCIETIES.

**Bath.**—The second sessional meeting was held on Nov. 2, when Mr. T. O'C. Parnell, Chief Inspector, lectured on "High Tension Electrical Discharges." The lecture was illustrated by "X" ray and wireless telegraphy apparatus, vacuum tubes, rotating discs, etc., etc.; 97 per cent. of the members were in attendance and followed the proceedings with great interest.

**Belfast.**—A general meeting of the staff was held on Oct. 17, and it was agreed to form a telephone society. The following officers were elected for the session 1910-11:—Hon. president, Mr. F. Cowley; president, Mr. J. D. W. Stewart; vice-presidents, Messrs. H. H. Broomhead and A. R. Pulford; hon. secretary and treasurer, Mr. J. W. Holmes; committee, Messrs. Speers and Ritchie, Messrs. D. Kernaghan, C. Boyce and W. P. Stanfield.

**Birmingham.**—The first meeting of the session was held on Oct. 10. Mr. Coleman was in the chair and distributed the certificates obtained by the successful Correspondence Class students last session. He made a few remarks appropriate to the occasion, emphasising especially the importance of technical training. Afterwards a paper was read by Contract Officer T. Rooke on "Contract Work," dealing with the difficulties and pleasures of the work a contract officer is called upon to do. An interesting discussion followed.

The second meeting of the session was held on Nov. 4, Mr. MacLure being in the chair. An admirable paper on "Double Lamp Clear," was read by Mr. Cornfoot, Chief Electrician, and an interesting discussion followed.

**Birmingham Operators.**—The second meeting of the session was held on Nov. 17, Miss G. Borg, Monitor, being in the chair. Mr. W. B. Benham, Assistant Traffic Manager, London, delivered a paper on "Junction Working in the Metropolitan Area." The lecture was illustrated by a number of diagrammatic slides which proved most interesting. There was a discussion afterwards which, unfortunately, had to be short on account of Mr. Benham's having to leave for London the same evening. There was a good attendance of members.

**Bristol.**—The first meeting of the session was held on Oct. 27, when Mr. F. W. Roberts, of the Inventory staff, read a paper on "Development." Mr. E. L. Preston was in the chair, supported by Mr. Dalzell, the Provincial Superintendent. Mr. Perkins, the District Manager, very kindly operated the lantern. Mr. Roberts' paper was listened to with great attention.

The second sessional meeting was held on Nov. 17, when a paper was given by W. H. Butler on "Private Branch Exchanges." The lecturer dealt in a very able manner with the intricate circuits necessary for this class of exchange, and illustrated his remarks by means of diagrams. Mr. Preston, Engineer, occupied the chair, and he was supported by Mr. R. A. Dalzell, Provincial Superintendent.

**Bristol Operators.**—The first sessional meeting was held on Oct. 27, when an address was given by Mr. R. A. Dalzell, Provincial Superintendent, on "The Ineffective Call, Distribution of Loads, etc." Mr. Dalzell set out in a lucid manner the loss caused to the subscriber and the Company through ineffective calls. Various points of the paper were much appreciated by the staff and a good discussion ensued. Mr. Alfred Perkins, District Manager, presided over an attendance of 63.

The second sessional meeting was held on Nov. 17, when a paper was read by Mr. N. B. Noble, Exchange Manager, Bristol, on "Service Observations." Mr. Noble emphasised the value of these observations and pointed out that they were not used in any way to detect individuals, but to eliminate weaknesses in the service and handicaps to the operators. A very animated discussion ensued, several of the operators taking an active part. Mr. Alfred Perkins, District Manager, presided.

**Brighton.**—The general meeting was held on Sept. 15, when arrangements were made for various papers to be given during the session. Mr. Chaplin, the secretary, having been transferred to Liverpool, a vote of thanks was passed to him for his services, and Mr. Parsons was elected secretary in his stead. Mr.

C. J. Phillips (Provincial Superintendent) was re-elected president and Mr. C. F. Moorhouse (District Manager) vice-president, and the following were elected as committee:—Messrs. G. Dowman, H. Drury, F. J. Frost, H. Hatton, W. Knight, E. V. Oates, D. Wallace, E. H. Elliott and W. Jenkins.

A meeting was held on Oct. 31, when Mr. F. J. Frost, Traffic Manager, gave an interesting lecture on "Notes on Traffic Study." The subject was illustrated by a number of lantern slides, and the lecture was followed by a short discussion.

**Bournemouth.**—The second meeting of the season took place on Nov. 9, when Mr. Plummer gave his paper on "The Testroom." Mr. I. L. Hunt, who occupied the chair, was well supported by 35 members. Mr. E. S. Plummer very ably explained the various duties that the Bournemouth test clerk has to carry out, and after he had concluded the discussion was carried on by Messrs. Moore, Blewdon, Young, W. Howe (District Manager) and others.

**Cardiff Operators.**—The first meeting of the session was held on Oct. 25, taking the form of a competitive night. Five papers were given by senior members of the society. The chair was taken by Mr. Williamson, Local Manager of Newport, who, after making the opening speech, took the opportunity of introducing to the society the new District Manager, Mr. H. Davis. The papers given were of exceptional merit, bringing out many important points. They were entitled: "Junction Working," by Miss S. E. Thorn; "Testing Operators' Duties," by Miss H. C. Van Riel; "Operating Irregularities," by Miss L. Wheeler; "Team Work and Supervision of Calls," by Miss A. M. Whittle; and "How the Monitorial System Helps the Operator," by Miss A. Bryant. The first prize was awarded to Miss H. C. Van Riel; the second to Miss S. E. Thorn; and the third to Miss L. Wheeler.

**Cardiff.**—The first meeting of the session was held on Oct. 20. Mr. Whetton was in the chair, and there was a good attendance. Mr. R. A. Dalzell, Provincial Superintendent, read a paper before the society, entitled "Traffic and the Value of the Telephone Call as varied by the Degree of Efficiency of each Individual Member of the District Staff." The paper, which was illustrated by diagrams, was thoroughly appreciated by all present.

**Cheltenham.**—Attention is drawn to the fact that at the meetings on Feb. 9 and March 23, 1911, awards will be given for the best papers given by operators and linesmen respectively. The awards will be made by the vote of the meeting, all the papers being read by the chairman, to conceal the identity of the writers. The reading of the papers is frequently the principal obstacle to bashful members of the societies, and this scheme will, at any rate, induce some to contribute to the meetings who would otherwise be unwilling to do so.

**Cork.**—The second meeting was held on Nov. 17. Reports of the past session's work and business were read by the secretary and treasurer. The president (Mr. Roy) made a few remarks, and then called on Mr. Hay to read his paper on "Measured Rate Recording in the Office." The paper proved very interesting, and the part of the ticket in the office was dealt with in detail. A few remarks were also made regarding its travels before reaching the office. The meeting terminated after a discussion entered into by Miss Gallagher, Mr. Roy and Mr. Lynn.

**Coventry.**—The following are the principal officers:—Hon. president, Mr. A. Coleman; president, Mr. Jno. Newburn; vice-president, Mr. R. S. Grosvenor; hon. sec. and treasurer, Mr. W. H. Oliver, District Office, Coventry. On Nov. 24 Mr. H. P. Lloyd will read a paper on "Transmission."

**Dover.**—The second meeting was held in the district offices on Nov. 15, when papers were read as follows:—"Definition of a Good Service," Miss L. A. Barker, Clerk-in-Charge, Folkestone; "'B' Operating from an Operator's Point of View," Miss G. M. Williams, Operator, Folkestone; "Party Line Operating," Miss N. Argar, Operator, Folkestone; "Management of a Sub-Exchange," Miss J. Argar, Operator, Cheriton. Discussion took place at the conclusion of each paper. There was a total attendance of 31, being 44 per cent. of the members, and fourteen other members of the staff.

**Edinburgh.**—The opening meeting, presided over by the late District Manager, was held on Nov. 7, and was attended by a large number of the staff. Mr. B. S. Cohen, of the Head Office, gave a lecture, illustrated by lantern slides, on "Transmission." The interest taken in the society by the members generally is indicative of a successful session.

**Exeter.**—The telephone society has started its 1910-11 session with two very successful meetings, the papers, "The Securing of Telephone Contracts" by Mr. J. Ritchie, and "Sidelines on Operating" by the Operators, being greatly appreciated. A library and other features are in course of formation.

**Gloucester.**—The session opened with a splendid attendance on Nov. 9, under the chairmanship of Mr. F. W. Sceats, vice-president. Mr. C. Elliott, District Manager, gave a very instructive and interesting paper on "District Office Work," dealing with expenditure and allocation, and explaining with a number of curve forms the method of arriving at and governing expenditure in the various centres. Interesting discussions followed, and a successful session is being looked forward to. Mr. C. Elliott is offering two prizes for the best competitive papers given on "Operating, Electrical and Clerical Work," and Mr. F. W. Sceats one for "Line Work." Mr. S. G. Hare has resigned the position of secretary and treasurer and Mr. W. G. Jack has been elected in his place.

**Hastings and Eastbourne.**—The first meeting of the present session of this society was held at Hastings on Nov. 2, when Mr. H. Hatton, of Brighton, gave a very interesting paper on "Accumulators." Mr. T. J. Hickmore occupied the chair in the unavoidable absence of Mr. Curling, the Local Manager.

**Hull Telephone Society.**—The second meeting was held on Nov. 14, when an excellent paper was read by Mr. Green (Head Office staff) on "Cable Design," illustrated by lantern slides. The lecture was extremely interesting to those members of the society who have the handling of cable.

**Isle of Man.**—The third meeting was held on Oct. 28 at Rosebery Chambers, Douglas. The District Manager opened the meeting by showing some interesting figures as to time allowed and actual time spent on instrument visits and clearing faults. In the absence of Foreman Smith through illness, Wireman King read his paper and showed some most interesting points in the repairing of twisted wires, etc. A keen discussion took place after the paper had been read.

**Leeds.**—Meeting held Nov. 16, Mr. W. R. Senior presiding, the speakers being Miss Dransfield and Mr. E. J. Gillett. Miss Dransfield's subject was "First Aid." This was considered in its general aspect, and also in its specific application to accidents to which the company's staff may be liable. Mr. Gillett dealt with "The Distribution and Recording of Underground Cable," illustrating his remarks with diagrams. The membership is larger than ever before, whilst the attendance at this meeting constitutes a record and gives good hopes of a successful session.

**Liverpool and Birkenhead.**—The first meeting of the session was held on Oct. 20, Messrs. R. Shepherd, T. A. Prout and E. S. Francis (past presidents of the society) being present. Mr. O. G. Lee, president, addressed the meeting. His association with telephone work covered a period of eighteen years, and for many years he had been an enthusiastic member of telephone societies. Mr. R. Shepherd (Provincial Superintendent) congratulated the society on their selection of a president, and in an interesting address made special mention of the extremely valuable work—valuable to the Company and to its servants—which was being carried out by the telephone societies. The distribution of silver cups, awards and certificates obtained in connection with the Company's Correspondence Classes was then proceeded with, Mr. Shepherd having kindly consented to undertake the presentations. The two silver cups (the gift of Mr. G. H. Robertson) were presented—to be held for one year—to Messrs. E. H. Morgan and H. B. Carroll for successes in the Correspondence Classes, the society also awarding to the former a gold medal, and to the latter a silver sovereign purse (Mr. Carroll having been awarded the society's medal last session). The remainder of the evening was occupied in a miscellaneous lantern lecture, including the following:—"Exchange Equipment" and "Line Work," kindly lent by the Engineer-in-Chief; "Gerrard Exchange, etc.," Mr. R. Shepherd; "Underground Construction, etc., in Ireland," Mr. Graham; "Nature under the Microscope" (photographs by Mr. W. K. Wood), together with photographs of members of the Liverpool electrical staff in the "early days," etc., etc., Mr. Wood.

**Liverpool and Birkenhead Operators.**—The first meeting was held on Oct. 11, Mr. Hidden presiding, when (at the special request of the society) Mr. Francis, Traffic Manager, read a paper on "Supervision." The paper was greatly appreciated, much valuable instruction being conveyed. The rendering of a few musical items brought the meeting to an agreeable conclusion.

On Nov. 11, Mr. C. W. Piggott, Traffic Manager, of Birmingham, read a most interesting paper, entitled "Past and Present," illustrated by a number of lantern slides. A short musical programme terminated a very enjoyable evening.

**Luton.**—Mr. J. H. Wilson (District Manager) opened the 1910-11 session on Oct. 24 by giving an interesting lecture on "Points for Consideration." He repeated the lecture at Watford on Oct. 31. An interesting syllabus has been prepared.

**Manchester.** The first paper of the session was read by Mr. H. Green, Engineer-in-Chief's Department, on Oct. 27, the chair being taken by the vice-president, Mr. G. F. Staitte, in the absence of the president, Mr. W. Cleary, who has been transferred to the Inventory staff. Mr. Green gave a description of the cables in use by the Company by showing the proportionate value of conductors to total cost of L.C. cables, relation of diameter of conductor and diameter of cable, tensile strength tests, adaptability of coloured pairs for identification purposes, also comparisons of pure lead and alloy lead and tin sheaths, tension in cable hauling, etc.

The second paper of the session was read by Mr. G. F. Staitte on Nov. 11, the subject being "Exchange Supervision," the Engineer, Mr. A. Magnall, presiding. Mr. Staitte divided his subject under three headings, the object of supervision, means, and application of means, and illustrated by curves shown on lantern slides the improvement in operating, i.e., the load dealt with by individual operators and the increase in revenue due to the introduction of supervision.

**Nottingham.**—A social evening to inaugurate the fourth session was held in the Huntingdon Street Schools on Oct. 28. An interesting musical programme was contributed by members of the staff. The chair was taken by Mr. H. Saywell. New members were enrolled for the session and the Correspondence Class certificates distributed.

**Nottingham Factory.**—The first meeting of the session took place on Oct. 21, Mr. Fenton presiding; 65 present. After a few preliminary remarks from the president, the official reader was called upon to read six papers sent in in connection with the "Ten-Minute Paper Competition," the names of the authors being kept secret until after the result of the ballot for prizes had been declared. The object of the competition was to encourage those who felt they were not yet qualified to attempt a paper of longer duration. Three prizes were offered, totalling 10s., divided *pro rata* to the number of votes received. The papers were most interesting, the following being their titles, and the prizes were obtained by the first three in the order named:—"The Improved Efficiency of the Hand Micro-telephone," "Practical French Polishing," "Ten Minutes in a Plating Shop," "The Object of the Correspondence Classes," "Keeping Wood-working Tools in Order," "A Complete Electro-Plating Plant" (illustrated). During the counting of the votes Mr. Fenton emphasised the importance of the Company's Correspondence Classes and also the local University College Classes in telephony, especially in view of the near approach of the transfer of the telephone undertaking to the Post Office.

**North East London.**—The first meeting of the session was held on Oct. 24, when (owing to the absence of the president, Mr. H. S. Peck, on the Inventory staff) Mr. F. Morley Ward kindly read a very instructive paper entitled "Ringing Dynamotors and their Uses," in the course of which he explained the construction and wiring of the machines, and how the various signals and tones were obtained, also the theory of party line and harmonic ringing systems. A new feature is being introduced this session by inviting members to send in notes of any difficulties with regard to their daily work, technical or Correspondence Classes, which are discussed at the ensuing meetings.

**Portsmouth.**—On Nov. 4 the opening lecture was given by Mr. Stanley Wainscot on "High Tension Electricity." It was illustrated by numerous



experiments with a large Wimshurst machine (constructed by the lecturer) and several experiments with Franklin's condensers, C' spark induction coil, vacuum tubes, etc., and about 24 lantern slides illustrating freak lightning conductors and the effects of lightning discharges, and an illustration of the false security of a badly erected so-called "lightning conductor." One feature of the lecture was the words "Success to the Society," picked out in small sparks connected across the terminals of the Wimshurst machine.

**Plymouth.**—The opening meeting took place on Nov. 9, when the president, Mr. R. A. Dalzell, gave a very interesting opening address, which was followed by a paper entitled "Economics," given by Mr. E. S. Byng, of the Inventory staff. Mr. Byng dealt ably with the subject and made it most interesting.

**Sheffield.**—The first meeting was held on Oct. 19, when, after the president's address, papers were read by Messrs. W. Thynne and A. Broomhead on "The Relationship of the District Office to Other Departments of the Company," and Messrs. H. G. Rowe and W. Burnett on "The Instrument and Service from the Point of View of the Subscriber and the Company." The chair was taken by the president, Mr. W. Thynne. There was a fair attendance and the papers were discussed at the close of the meeting.

The second meeting was held on Nov. 16, when a paper was read before a good attendance of members (over 85 per cent. being present) by Mr. J. Scott, the Assistant Provincial Superintendent, on "Notes and Comments on Management." The chair was taken by the District Manager, Mr. R. C. Bennett. The paper was thoroughly enjoyed by those members present, the subject was treated so broadly that discussion was somewhat limited.

**Sheffield Operators.**—The first meeting was held on Oct. 27 and took the form of a whist drive. A very enjoyable evening was spent, 148 members and friends were present, only one prize, however, came to the staff, this being the ladies' first prize, which was won by Miss H. Mettam. Mr. S. K. Vaughan (Exchange Manager) took the duties of M.C.

The second meeting was held on Nov. 17, when the president, Mr. E. J. Johnson, gave his presidential address before a fair attendance of the operating staff. Discussion took place at the close of the meeting on points referred to in the address.

**Southern London.**—This society held a very successful meeting at the Hop Exchange on Nov. 2, when a paper on "Line Maintenance" was read by Mr. J. Hayes, with Mr. Woollard, D.M.E., kindly undertaking the duties of chairman in the absence of the president. By dealing with the subject in a practical way the point of view of the fault-finder was emphasised and with the aid of many slides his difficulties pointed out.

**Southampton Operators.**—A society has been formed and a syllabus prepared covering various phases of traffic. The president is Mr. W. Howe; vice-presidents, Messrs. J. Gwyer and S. O. Allen. The lecturers for the session 1910-11 are Misses Smith, Starkey, C. G. Haynes and L. H. Haynes, Southampton, and Miss C. Harper, Bournemouth, Messrs. J. Gwyer, E. Quinn, A. Wilson and S. O. Allen, Southampton. The inaugural meeting is fixed for Nov. 28, to be followed by a social evening at the Grosvenor Restaurant.

**Sunderland and South Shields.**—The first monthly meeting for session 1910-11 was held at Sunderland on Oct. 26, Mr. E. Spink presided. The election of officers took place and the following were duly elected:—Hon. president, Mr. A. L. E. Drummond; president, Mr. W. J. Douglass; vice-president, Mr. J. G. Dixon; hon. secretary and treasurer, Mr. Thos. E. Thompson; committee, Messrs. E. Spink, R. Guthrie, J. Smith and J. Martin. The rest of the evening was devoted to a discussion on "Telephone Matters." The new proposed P.O. automatic operating, the P.O. telephone developments at North Shields, and other items regarding telephone work were discussed.

**Swansea.**—The second sessional meeting was held at the Docks Exchange Hall on Nov. 16, Mr. W. E. Gauntlett (District Manager) occupying the chair, when a very interesting and instructive paper, entitled "Some Notes Concerning the Maintenance of Primary Batteries," was given by Mr. A. L. Stanton (Acting Electrician). Important points relative to the making up and maintenance of local batteries were dealt with, and the need for the carrying out of efficient tests emphasised. The paper provoked an animated discussion, in which several members took part. There was a very good attendance, 72 per cent. of the membership being present, together with eleven visitors.

**Swansea Operators.**—The second sessional meeting was held at the Docks Exchange Hall on Nov. 9, when two excellent papers were given by Mr. A. G. Bristow (Traffic Manager) on the following subjects:—"A Chat to the Swansea Operating Staff" and "A Trip Across America" (illustrated by lantern slides). The first paper dealt with the position and progress of the Swansea operating staff individually and collectively, pointing out the aims and ideals essential to success and the means of attaining the same. The short but interesting lecture which followed was illustrated by some excellent views of the most famous cities and scenery of America.

**Tunbridge Wells.**—A social evening in connection with the above was held at Ralph's Restaurant, Tunbridge Wells, on Oct. 19, and a most enjoyable evening was spent. During the evening the vice-president announced the programme for the coming session of the telephone society, a feature of which will be discussions on matters dealt with in the Correspondence Classes, which will follow the reading of the usual papers. The secretary intimated that a series of prizes had been promised for the best papers read.

**Western Metropolitan.** The opening meeting of the 1910-11 session was held at Gerrard Exchange on Oct. 27, on which occasion Mr. W. B. Cardon read a paper on "Central Battery Intercommunication Telephones Ashore and Afloat." Lantern slides were shown to illustrate the circuits, and the paper proved very interesting.

**Wolverhampton.**—The first meeting of the session was held on Nov. 11, when Mr. H. G. Watkin, of Hanley, gave some practical demonstrations of wireless telegraphy and "X" rays. His lecture and experiments were closely and enthusiastically followed by an audience of 52. Mr. Archer W. Smith, District Manager, occupied the chair, and before the lecture he distributed the certificates (25 in all) to the members who had gained them in connection with the Correspondence Classes of last session.

## STAFF GATHERINGS AND SPORTS.

**Cork.**—A social evening and dance was held on Oct. 28, under the auspices of the telephone society, when a company of 60 of staff and friends spent a very enjoyable evening. The following officers have been appointed for the ensuing session:—President, Mr. J. Roy; vice president, Mr. A. Lynn; treasurer, Mr. G. Henry; secretary, Mr. W. Patterson; committee, Misses Gallagher and H. Peard, Messrs. W. Clifford, P. Clifford and H. Hay.

**Manchester.**—The C.D. Club held their first meeting for the session 1910-11 on Oct. 10. There was a capital attendance of members, and the proceedings started with a tea, followed by a good musical programme. Mr. Elliott was in the chair, and in his opening remarks gave a short *resumé* of the work of last session. Mr. Magnall, District Engineer, and Mr. Staite, Traffic Manager, were the guests of the evening. Added interest was attached to the proceedings by the presentation of wedding gifts to Messrs. Dawes and Ellis, consisting of a salad bowl and Sheraton clock respectively, subscribed for by the members of the contract staff.

**Swansea.**—A whist drive and dance in connection with the Swansea Operators' Society was held at the Hotel Grosvenor, Swansea, on Oct. 28, when a gathering of about 50 members and friends spent a very enjoyable evening. The prize winners at whist were: First prize, ladies, Miss C. Johns; gentlemen, Mr. W. Allen. Consolation prize, ladies, Miss M. Roach; gentlemen, Mr. Parnell. Dancing was commenced at 10.30 p.m. and continued until one o'clock, at which hour the company dispersed, delighted with the success of the gathering.

**Plymouth.**—The Plymouth and Inventory staffs and other friends, numbering 100, spent a very enjoyable evening on Nov. 12 at Goodbody's Café, Plymouth, the function being a whist drive and dance. The prizes for whist were secured by the following:—Ladies, first, Mrs. Thorn; second, Miss Page; consolation prize, Miss A. Ellis. Gentlemen, first, Mr. Hague; second, Mr. W. M. Hannaford; consolation prize, Mr. R. Thorn. The evening was an entire success, thanks to the efforts of Mr. C. E. Drabwell and Mr. W. E. Walter, who acted as M.C.'s, and to the organising committee.

**Brighton.**—The Brighton staff held a whist drive and dance at the "Bon-Bon" Shop, Preston Street, on Nov. 16, when 76 members of the staff and friends were present. Mr. H. Drury acted as M.C., assisted by Miss Trott, Miss Agutter, Mr. E. J. Clarke and Mr. W. Jenkins, the latter of whom also assisted as dance M.C. The prizes were distributed at the close by Mr. C. F. Moorhouse, District Manager, and a vote of thanks was passed to the M.C. and those who assisted. Mr. R. Curling, Local Manager, Eastbourne, Mr. T. R. K. Rogers, of the Head Office audit staff, and Mr. Vaughan, of the Brighton Post Office, were among the visitors taking part in the drive. The prizes fell to Miss M. McManns, Miss M. Webb, Mrs. G. Gunning, Mrs. Drury and Messrs. B. Britt, W. Tyler and R. H. G. Houndle.

**Great Yarmouth.**—On Nov. 5 a football match took place at Yarmouth between the Norwich and Yarmouth staffs. The Norwich team had most of the play and won easily by three goals to nil, thus recapturing possession of the "Megohm" cup. The goals were scored by W. Parish (1), and A. J. Balls (2), both district office clerks. An enjoyable tea and smoking concert, presided over by Mr. J. D. Pugh, Local Manager, pleasantly terminated the day's proceedings.

[Several reports of Staff Gatherings are held over until next month owing to lack of space.]



THE above photograph represents a group of Territorials, who, with seven others, form Nottingham Factory's contingent towards Home defence.

The following are represented in the group: Royal Horse Artillery, Yeomanry, Robin Hoods (Seventh Battalion), Eighth Battalion Notts and Derby Regiment, Field Ambulance, R.A.M.C.

There is no Engineers' corps available near Nottingham, otherwise the number would probably be greater.

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## TELEPHONE MEN.

### LVI.—WILLIAM FREDERICK TAYLOR.

WILLIAM FREDERICK TAYLOR was born in 1879 at Ayr—

"Auld Ayr wham ne'er a toon surpasses  
For honest men and bonnie lasses,"

as Burns says. Mr. Taylor's stay in the town of his birth was not of long duration, for when he was four years old his parents removed to Glasgow, his father having been promoted to the Governorship of Barlinnie Prison. Mr. Taylor was educated firstly at a private school, and subsequently at the Glasgow High School. He later, whilst in the Company's service at Glasgow, attended the West of Scotland Technical College, and obtained certificates in magnetism and electricity, first class in telephony and telegraphy ordinary grade, and first class in telephony honours grade in the City and Guilds examination. He was also successful in obtaining a first prize in the honours examination in telephony. After leaving school, Mr. Taylor spent some time on mechanical work in order to learn the use of tools, having by this time determined to enter upon an engineering vocation. With this in view he entered the service of the National Telephone Company in February, 1896, as an apprentice-mechanic, and as such he occupied himself in the mechanics' shop in Glasgow for a year, gaining useful experience of switchboard and instrument work under the guidance of Mr. Tom Donaldson, the chief mechanic. At the end of this period Mr. Taylor was removed to Dundee, where he had the opportunity of obtaining experience in various phases of the Company's work. He first became an instrument fitter, and as, during his stay in the town, the process of changing from the earth circuit to the metallic system was in operation, he was given the opportunity of taking a share in this work.

Mr. Taylor's stay in Dundee was not a long one. At the end of fifteen months he was transferred to Glasgow and appointed to the Fitting Department in that town. In November, 1898, he received promotion, being appointed Test Clerk. This post he occupied for a year. Mr. Taylor's next move was to a different branch of the Company's business—viz., the engineering. He was first appointed as Clerk to the Glasgow Engineer, and during the time he spent in this department he never missed an opportunity of acquiring knowledge and experience in order to fit himself for higher and greater responsibilities. In a very short time his zeal and

ability were fittingly recognised by his promotion to the District Managership of Stirling, which post he occupied until 1903.

At this date the Company resolved upon and inaugurated a policy in connection with the development of its business which has practically revolutionised the methods which had been previously adopted for the same purpose. Up to that time it had been the practice to "rent a telephone" and no very great difficulties were met with in the manner the Company's business was presented to the public, but with the advent of different grades of service involving a variety of tariffs, it became necessary to organise a special department to deal with these new conditions, with the result that Contract Departments, which are now part of the Company's organisation in all the districts, were introduced. Glasgow was one of the first places, however, to establish such a department, and Mr. Taylor was selected to take charge. He entered into his new duties with that keenness which always characterises everything which he takes in hand. Glasgow was at that time in the throes of a severe competition with the Corporation. Mr. Taylor, however, seemed to be in his element, and there is no doubt that the success which attended the Company throughout its fight with the Corporation was due to the zeal and enthusiasm of all who assisted in it. Three strenuous years were in this way spent in Glasgow.

In the summer of 1906 Mr. Taylor took a flying visit to America, where he occupied his holiday in enquiring into the American methods of contract work; he visited several of the important towns, including New York and Philadelphia, and he was fortunate enough to bring away with him some valuable hints on contract working generally as practised in the States. On Mr.

Taylor's return to England he learned from his JOURNAL that he had been appointed to the responsible position of Contract Manager for London. Mr. Taylor's first duty on taking up his new appointment was the re-organisation of the department, and this work was carried out with great success, and says much for Mr. Taylor's organising ability. Mr. Taylor has temporarily relinquished the post which he has held with great credit to himself and with advantage to the Company during the last four years, to fill the position of Divisional Officer on the Inventory staff.





Mr. Taylor has a thorough knowledge of his business, and is thereby able to appreciate all the difficulties that are inherent in contract work. He is firm and just in the control of his large staff, and whilst he is not one to overlook "any slackness" that comes under his notice, he is always ready to offer a word of praise for work well done.

He is a thorough believer in a word of encouragement at the right time, and has deservedly won not only the respect of his own staff but of all that have been brought into business relations with him. With his colleagues he is on the friendliest terms, and he enjoys to the full the confidence of his chiefs.

Mr. Taylor confesses to no particular hobby. Gardening, however, has a great fascination for him, the growing of roses being his speciality. Walking is his recreation, and when not engaged in this healthy pursuit he devotes most of his spare time to reading, of which he is extremely fond.

### LONG-DISTANCE TELEPHONY.

By J. J. CARTY.

[Mr. Carty, Chief Engineer of the American Telephone & Telegraph Company, made the following remarks on this subject at the second International Conference of European Telegraph and Telephone Administrations (held at Paris).]

MR. PRESIDENT AND GENTLEMEN,—I think that my contribution to this discussion can best take the form of a general statement, setting forth some points with respect to the condition of long-distance telephony in the United States.

The present state of the art with regard to long-distance telephony in the United States involves the use of two gauges of copper open wire toll lines—namely, No. 12 N.B.S.G. (2.64 mm.), weighing 173 lbs. per wire mile (42.3 kos. per km.), and No. 8 B.W.G. (4.2 mm.), weighing 435 lbs. per wire mile (122.6 kos. per km.), and the use of underground and aerial toll cables with conductors varying in size from No. 16 B. and S. (1.3 mm.), 42 lbs. per wire mile (11.8 kos. per km.), to No. 13 B. and S. (1.8 mm.), 83 lbs. per wire mile (23.4 kos. per km.) paper insulated twisted pairs. The open wire circuits are both loaded and non-loaded, and the non-loaded circuits are frequently used in conjunction with telephone repeaters, both of the test board and cord circuit type. The cable circuits used in connection with long-distance telephony are invariably loaded.

In addition to the use of physical circuits there is a great deal of phantoming of non-loaded open wire toll lines. Cable circuits are phantomed to but a small extent however.

In addition to the foregoing, which are in actual commercial use, the development at present taking place in connection with long-distance transmission, contemplates the use of larger gauge loaded cable circuits arranged for phantoming and the phantom working of loaded open wire toll lines. These points are taken up under the separate headings below.

**Open Wire Toll Lines.**—At the present time the standard of transmission aimed at for long-distance work is the equivalent of about 850 miles of No. 8 B.W.G. (1,360 kms. of 4.2 mm.) copper circuit (about 30 miles of No. 19 gauge cable—48 kms. of 0.9 mm.) The exact distances for which it is permissible to use the different classes of constructions depend to a considerable extent on the terminal conditions, that is the amount of underground toll entering cable and the uses to which the circuit is to be put; for example, whether it is largely for terminating business or is to be used mainly in connection with other circuits. The following table shows the relative transmission efficiencies of the different classes of non-loaded and loaded circuits at present employed:—

Open wire circuit.	Miles equivalent to 1 mile No. 19 B. and S. cable (0.054 mf.).	Relative efficiency.
No. 12 N.B.S.G. (2.64 mm.) non-loaded	12.8	1.00
" " " loaded ...	30.2	2.36
No. 8 B.W.G. (4.2 mm.) non-loaded ...	29.0	2.26
" " " loaded ...	67.0	5.23

"In general the No. 12 N.B.S.G. (2.64 mm.) circuits are used for

the short haul toll connections or as feeders for the long haul toll circuits, that is for connecting the terminal points to toll centres which have long haul facilities. The No. 12 N.B.S.G. (2.64 mm.) loaded circuits and the No. 8 B.W.G. (4.2 mm.) non-loaded circuits are used for long haul toll lines. As the above table shows, these two circuits have approximately the same transmission efficiency, and the principal reason why there are any non-loaded No. 8 B.W.G. (4.2 mm.) circuits in the plant at the present time is due to the fact that, in the days before it was feasible to load open wire circuits, the No. 8 B.W.G. (4.2 mm.) wires were universally used for long toll lines. Owing to the inherent characteristics of loaded lines the loading of large gauge aerial circuits was not made practicable until very recently. As fast as the present plans can be carried out all of the No. 8 B.W.G. (4.2 mm.) circuits now in the plant, and certain other circuits which will be required to take care of the long-distance traffic, are to be loaded. This new loading contemplates the arrangement of the circuits for phantom working. When this is completed the loaded No. 8 (4.2 mm.) gauge circuits, both physical and phantom, will constitute what might be termed "extra long haul" circuits.

**Aerial Loading.**—At the present time there are about 52,000 miles (83,500 kms.) of loaded No. 12 N.B.S.G. (2.64 mm.) circuit in the United States, and about 1,000 miles (1,600 kms.) of No. 8 B.W.G. (4.2 mm.) loaded circuit. There are at present under construction, or intended for completion by Jan. 1, 1911, about 17,000 miles (27,200 kms.) No. 12 N.B.S.G. (2.64 mm.) loaded circuit, and about 13,000 miles (21,000 kms.) of No. 8 B.W.G. (4.2 mm.) loaded circuit. Of this latter about 3,800 miles (6,100 kms.)—namely, four circuits from New York to Chicago—will be arranged for phantom working.

The efficiency of these two phantom circuits from New York to Chicago is expected to be substantially greater than the physical circuits of which they are composed. Either of these two phantom circuits may be connected at Chicago to a pair of loaded No. 8 B.W.G. (4.2 mm.) wires extending from Chicago to Omaha. At Omaha these two wires may be connected to a phantom circuit made up of four loaded No. 8 B.W.G. (4.2 mm.) wires, now being constructed between Omaha and Denver. Over this combination of circuits it is expected, about Jan. 1 next, that we shall be able to get a fairly good talk between New York City and Denver, Colorado, and that, by means of this and similar combinations of circuits, the value of the transmission obtained between New York and the far Western cities will be very greatly increased. Over these circuits—or over sections of them—it is proposed to operate in the standard manner each wire for the purpose of duplex telegraphy which can be carried on over these wires while they are being used for telephone purposes. Thus we may have going on at the same time two independent and non-interfering telephonic conversations between New York and Chicago, also two independent and non-interfering telephonic conversations between Omaha and Denver. In addition to this, a third conversation may take place—at the same time and over the same wires—between Denver and New York. While all of these telephonic conversations are taking place, eight (8) telegraphic messages may simultaneously be sent over these circuits, none interfering with the others nor with the telephone transmission.

Some idea of the economic importance of this loading and phantom work may be gained when I state that the re-arrangement of the circuits on the new plan between New York and Chicago is being accomplished at a cost of \$110,000 (frs. 572,000). The improvement in efficiency in the transmission of speech thereby obtained and the additional improved circuit which phantoming gives to us would cost more than a million dollars (\$1,600,000) (frs. 8,320,000) if obtained in the ordinary way.

With the loading coils and lightning arresters as now constructed, there is very little trouble due to the failure of the loading coils, and practically no trouble due to low insulation in the arresters. These latter are also constructed in such a manner that there is practically no maintenance on them.

In the early attempts to load serial circuits one of the chief difficulties arose from inability to protect the loading coils from lightning with an arrester which did not require an excessive amount of attention, and it was largely for this reason that the early attempts at aerial loading were a failure.



At the present time the chief trouble on loaded circuits has been occasioned by low insulation due to leakage at the bridling points. This has been corrected by the adoption of the bridle wire electrose insulator, which insures a break in the conducting path along the wet bridle wire.

**Phantoming.**—The phantom of non-loaded circuits involves the use of phantom repeating coils on the component side circuits. These coils necessarily introduce a certain amount of transmission loss so that the efficiency of the side circuits is slightly reduced. The phantom circuit produced is, however, considered more efficient than the original side circuits, and where phantom is adopted in the toll plant it is usual to arrange the traffic so that the long haul connections will be put up on the phantom and the shorter haul connections on the side circuits.

**Loaded Phantoms.**—By properly arranging the windings on the loading coil cores, by observing extraordinary precautions in the manufacture and by constructing special coils arranged for four sets of windings, it is possible to phantom loaded circuits and to load the phantom thus produced. The impairment in the efficiency of the loading side circuits due to the introduction of the phantom loading coil is slight, and the loaded phantom has materially higher transmission efficiency than either of the side circuits.

By the adoption of this phantom loading, the preliminary work on which is just being completed, one of the chief drawbacks to the extensive use of aerial loading will be overcome, and at the same time the range of transmission will be considerably increased. The limitation to loading which has existed in the past due to inability to phantom the loaded circuits has been due to the fact that it has been necessary to choose between the economies of phantom with practically no increase in the transmission range, or to load the physical circuits thus extending their transmission range and to provide additional physical circuits to care for increased traffic. With phantom loading both benefits will be available.

**Superimposed Telegraph.**—All of the long-distance toll lines are used for superimposed telegraph working. This applies also to phantom circuits.

Both simplex and composite combinations are in use. Both involve grounded telegraph operation. In the first of these the two wires of a pair are used in parallel as a telegraph conductor, and in the second each wire is used as a separate telegraph circuit. Straight and duplex Morse working are in vogue, and while automatic keys are used to a considerable extent, there is no present operation of high speed machine sending. The loading of circuits does not interfere in any way with their applicability for telegraph purposes except that it places a limitation on the maximum value of the telegraph current, i.e., it is not possible to employ such currents as will magnetise the loading coil cores.

**Cable in Connection with the Long-Distance Telephone Service.**—Paper insulated cables are employed for two purposes in connection with the long distance telephone plant (this does not include the use of cables for toll-switching trunks). The first of these is for bringing open wire toll lines into the centres of cities where it is not possible to install and maintain open wire leads, and the second is for use between large toll centres where the volume of terminating traffic is such as to require a large number of circuits. Under these conditions it is economical to instal underground toll cables for very considerable distance.

For both classes of service the cables are invariably loaded.

**Toll Entering Cables.**—Cables for toll entering purposes range in size from No. 16 (1.3 mm.) to No. 13 B. and S. (1.8 mm.) gauge conductors, depending upon the character of the open wire toll lines and are the loaded, light, medium or heavy, depending upon their length, upon whether the open wires are non-loaded or loaded and upon whether the toll switching trunks are non-loaded or loaded. As the number of circuits in the toll entering cables is always in excess of the number of toll lines to be brought in, considerations of the warranted expenditures for a given transmission gain result in the cable conductors being somewhat smaller than those of the open wire lines which they are to serve. In determining the proper gauge of any toll entering cable, this cable is so arranged as to be in cost-equilibrium with the open wire plant which it is to serve.

**Duplex Cables.**—At the present time practically all of the toll entering cables are of ordinary construction, that is, not arranged for phantom working. Duplex cables and proper loading coils for use on them have recently been devised and are being installed. The employment of such cables will make it possible to employ phantom of the open wire plant to full efficiency, as it will remove the necessity of placing the phantom repeating coils on the outer end of the toll entering cable by permitting the phantom circuits to be carried into the toll office as such, thus making all the wires available for composite operation.

**Toll Cables.**—Between certain large cities—for example, between New York and Philadelphia, New York and New Haven, Chicago and Milwaukee, Boston and Worcester, Boston and Brockton the volume of traffic is sufficient to warrant the provision of special high-grade loaded cable circuits in underground conduit. At the present time these circuits are in cables of ordinary construction, that is, not arranged for phantom working, and are usually provided with heavy loading. To provide the necessary transmission efficiency the cable conductors for the long haul circuits are usually No. 14 (1.6 mm.) or No. 13 B. and S. (1.8 mm.) gauge. A certain number of smaller gauge conductors for service to intermediate points are frequently incorporated in the same cable sheath. The standard full-sized sheath is 2½ inches (66 mm.) outside diameter and the sheath thickness is ¼ inch (3.2 mm.). The paper insulated conductors have a mutual electrostatic capacity of about .068 mf. per mile (.042 per km.).

In cases of this kind, where a large number of circuits are provided in a single sheath, special rapid operating methods are in vogue. The circuits are also employed for superimposed telegraph working.

**Extension of Underground Working.**—At the present time we are preparing to install an all underground cable route from New York to Washington, a distance of 235 miles (378 kms.), and from New York to Boston, a distance of 235 miles (378 kms.). The cable in these routes is to be of special duplex construction, that is, arranged for phantom working and both the side circuits and the phantom circuits are to be loaded. The cable will be of standard size and will contain seven quads No. 10 B. and S. (2.6 mm.) conductors, eighteen quads No. 13 B. and S. (1.8 mm.) gauge conductors, six pairs of No. 13 B. and S. (1.8 mm.) gauge conductors unphantomed, and eighteen pairs of No. 16 B. and S. (1.3 mm.) gauge conductors unphantomed. The loaded No. 10 (2.6 mm.) gauge physical and phantom circuits and the loaded No. 13 (1.8 mm.) gauge phantom circuits will give a high grade of transmission from New York to Washington or Boston, and the No. 13 (1.8 mm.) gauge loaded side and non phantom circuits will give transmission to intermediate points. No. 16 (1.3 mm.) gauge conductors will be used for short haul service along the route and for telegraph operation.

It will be seen that over the circuits of this cable phantom working will be accomplished, superimposed telegraph working will also be used, so that over two pairs of wires three independent telephone conversations may take place simultaneously, and at the same time eight telegraph messages may be sent, all without interference.

**Phantom Loading Coils.**—With the standard coils now in use it is not possible to secure efficient phantom working. The coils have, however, been re-designed to eliminate this difficulty, and in the future all coils are to be manufactured so that they may be employed on duplex cable. In the case of the New York to Washington and New York to Boston cables the associated side circuit and phantom loading coils will be mounted in the same pots, all of the cross-connecting being done at the factory. The plant force will, therefore, have simply to connect the stub cable into the main cable.

**Certificate for Saving Life.**—Mr. C. A. Bevan, Cashier in the district office, Swansea, who assisted in rescuing a young lady from drowning at Langland Bay, near Swansea, about three months ago, is the recipient of a certificate recording his gallantry. The presentation was made by the Mayor of Swansea at the Guildhall in that town.

## THE PERFECT CASH CLERK.

By D. B. HEBENTON, *Glasgow.*

THERE may, at the present moment, be an impression that anyone, so long as he can make out a receipt for six-and-eightpence and subtract that sum from half a sovereign, is good enough for the public counter. Lest such an opinion should gain any degree of currency, let it at once be said that such is not only far from being the case—it is a slur upon one of the most important posts filled by the minor staff. For, in addition to all those qualities which constitute clerical efficiency, it possesses several particular requirements, and the successful cash clerk is in a way a specialist.

The cash clerk should be of a good height and should at least look his age. He should be neither so short as to appear insignificant nor so tall as to place the subscriber at a like disadvantage. One has recollections of a counter clerk—now in another clime—who, while standing behind the counter, could almost pick up a threepenny-bit from the floor on the other side. Although his reach was useful, he was rather large, for, although the subscriber may be looked up to, he must not be looked down upon. He should be most particular as to his toilette and manure. In the cold winter mornings one is sometimes apt to leave too little time for shaving, but, while such procrastination may be sympathised with in other parts of the building, it cannot be countenanced at the counter.

He should possess clear speech and pleasant manners. The former is most essential, for so many questions are continually being put that the clerk who can give his replies in clear tones saves repetition and consequent loss of time. In the absence of an enquiry office, its duties fall upon the cash office. But the counter clerk should always bear in mind that he is there primarily to collect money. His object should be to behold the back and not the face of the subscriber, and, should a short explanation not suffice, the latter should at once be referred to the department concerned. There *are* people who appear to like the sound of their own voices, and the clerk who can terminate an unnecessary conversation has a good card up his sleeve. A good business man, who himself uses terse, direct language, prefers that kind of speech in others, while the garrulous deserve to be met with as few words as possible.

Although there is something to be said for the linguist who can vary his speech to suit the occasion, the cash clerk should avoid slang expressions. One has heard it told of a certain clerk of the long ago who, no matter how crowded or busy the counter might be, would sometimes stop in the middle of a receipt to greet a sporting friend with such a remark as "Hoo did ye's get owin on Saturday, Joney?" Such a person was obviously unfit for his position. On the other hand, a "Kelvin-side" accent ought not to be cultivated. One cannot feel other than sorry for the young person who says "men" when he means the singular, and, in a way, he is more to blame than his vulgar opposite because the latter is such from ignorance, whereas he is so from choice.

Of manners, there may sometimes be a tendency to overdo these. This is particularly the case should the subscriber take the form of a rather genteel young lady. To this it should be remarked that the counter provides neither the time nor the place for amorous pursuits, and there, at all events, the lady killer is entirely out of place. Simple civility is all that is required, and to "smile the smile of a dependent" or to "sir" a man's every remark is quite unnecessary.

Sometimes it is better to take the upper hand of the subscriber; sometimes to "sing dumb"; and it is well if, before commencing a dispute, the clerk possesses the faculty for weighing-up the subscriber. One should never enter into an argument without a full knowledge of the point at issue, for there is no ignominy on earth like that of being cornered—of being found wanting where one should know all.

Of all counter requirements, however, the most important are exactness and coolness. In the handling of money it is absolutely essential to be quick and accurate, for mistakes made there cannot be remedied as in other departments, and should the error be on the wrong side, the cash clerk's pocket will be the sufferer. The opportunity presents itself sooner or later for losing one's head, and unless a proper grip is kept something is bound to

go wrong. Under extreme pressure the writer has given change in a mechanical kind of fashion without *knowing* that the money given was the correct amount. Likewise, he has been asked to give change for a colleague who had momentarily lost his self-control. Therefore, when the pinch comes, coolness is of the greatest value at the counter.

Summarising the foregoing it would appear that the perfect cash clerk should possess:

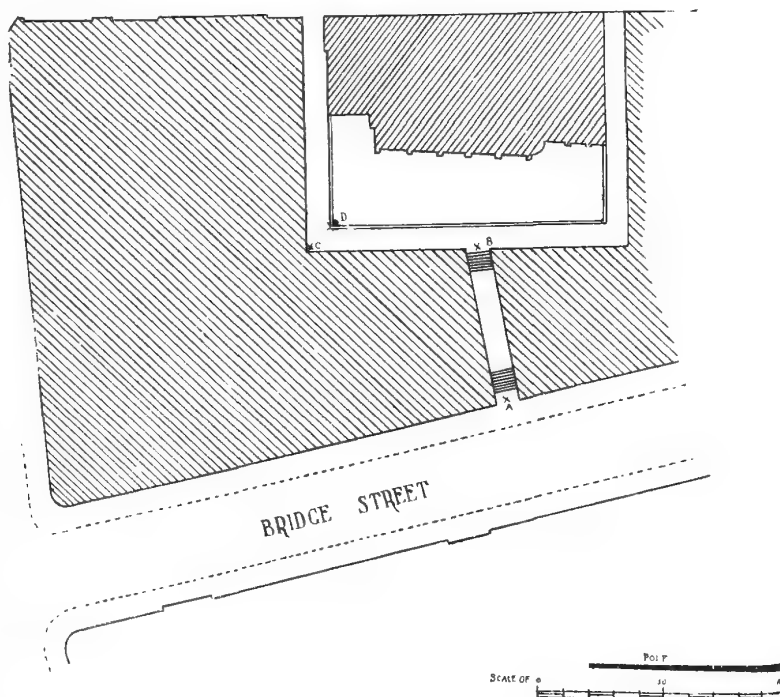
- A good appearance and address.
- Clear, direct speech, devoid of mannerisms.
- A manner "courteous but not courtierlike."
- A good all-round knowledge of the Company's business.
- Great accuracy, and
- A coolness that should never amount to nonchalance.

Such a type is the product not of chance but of adaptability, cultivation and common sense.

## ERECTION OF LARGE POLES IN DIFFICULT PLACES.

By E. L. PRESTON, *Engineer, Bristol.*

As is well known, the telephone engineer's troubles are numerous and varied. One of the most recent locally met with and overcome may prove interesting. An H roof distributing pole, with a capacity for 102 circuits, erected in connection with the first Bristol underground scheme, had to be removed at short notice. The first consideration was how to deal with the existing and anticipated circuits; whether another roof pole should be erected or a



ground pole; or whether covered distribution should be adopted, having regard to efficiency and economy. A study of the circumstances indicated that the best method was the erection of a tall ground pole, although the proposed (and, in fact, the only available) position C was an extremely awkward one. The preliminaries having been settled, a start was made, but when the pole had been got out to a depth of 4 feet to 5 feet a hidden cellar was discovered. As this was upon a different property involving another D.P. agreement and the usual delay attendant on this, work was temporarily abandoned, permission being sought to erect the pole some feet away on the original grantor's property and clear of the cellar at point D. The grantor's agent agreed to this and the

next stage was entered on. The pole to be erected was 80 feet in height and about  $2\frac{1}{2}$  tons in weight, and it will be obvious from the sketch-plan that the restricted space made the job one of consider-

start was made, the pole being derricked at A and dropped into passage A B. Fig. 1 shows this passage and flight of steps. The pole shown being lowered is not the 80-foot but a 45-foot derrick,



FIG. 1.

able difficulty. The spot is in the heart of the city, and Bridge Street is one of the busiest streets as regards traffic. It was necessary therefore to start the work at night. At midnight a

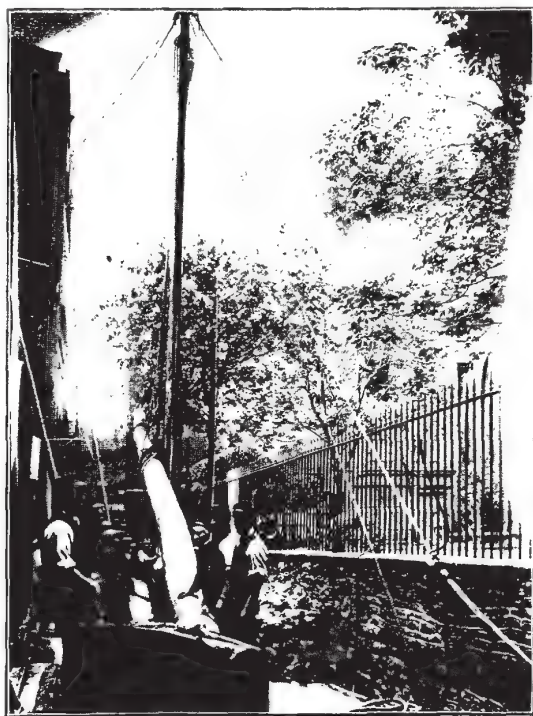


FIG. 2.

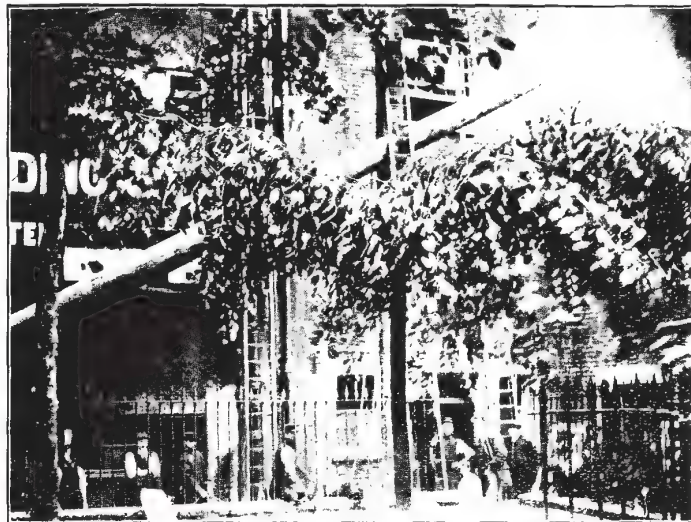


FIG. 3.

which in turn had to be erected and lowered by means of a smaller derrick. A good deal of trouble was caused by the numerous open wires at this point, all these having to be dipped in semi-darkness) before the pole could be swung into the passage. The pole was then derricked at B and dropped along



FIG. 4.

the lane at back (Fig. 2). Fig. 3 shows the pole being lifted again at D. Fig. 4 shows it being lowered into what was thought to be its final resting place, after eighteen hours' continuous work. It was now imagined that our chief trouble was over, and the pole was stayed, steel wires were run



for aerial cables, and some open wires transferred, when the grantor came on the spot, repudiated his agent's action, and insisted on the pole being erected in the originally proposed position. This,



FIG. 5.

of course, meant that a distributing pole agreement had to be entered into for the cellar. This was successfully completed, and the pole was lifted from the spot in which it had been deposited and

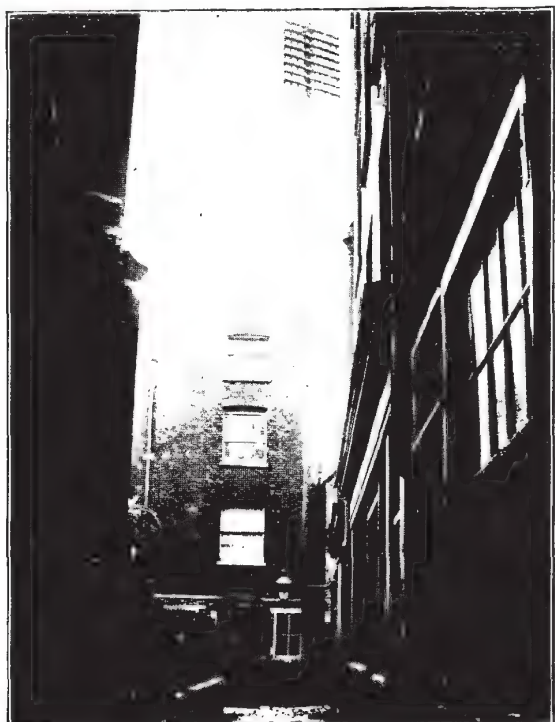


FIG. 6.

dropped into the cellar, which I hope will be its permanent home. There is nearly 13 feet of pole below the ground line. Figs. 5 and 6 give two views of the pole when the work had been completed. The estimate was naturally greatly overspent, and indicates what a difficult job it must be to find the values of certain poles in place, and I think that most engineers would be under rather than over the correct figure.

I would here like to compliment all members of the staff who took part in this work for their united efforts, which were excellent, as a large portion of the work was carried out under most unfavourable weather conditions, and the whole of the work was of an extremely risky nature, and called for exceptional skill and care.

The photographs are the work of official photographer Wayleave Officer Saunders.

### TELEPHONE WOMEN.

#### LXXXII.—ANNIE ELIZABETH REEKIE.

Miss REEKIE, although, as her name denotes, of Scotch descent on her father's side, is a Londoner by birth, having been born in Marylebone, and receiving her education at schools in the City and Tottenham.



ANNIE ELIZABETH REEKIE.

At the present day, when new operating staff enter the service at an average of about nine per week, one is able to appreciate the difference which existed when Miss Reekie made application to enter, as she was then told that there were 50 names in front of her's, and that she would doubtless have to wait for a year for a vacancy. As a matter of fact, it was almost two years to the day when she received notification to present herself for duty at the Bank Exchange—viz., on May 5, 1893—and by that time she had actually almost forgotten making her application. The Operating School was not then in existence, but, when inaugurated, Miss Reekie had a great ambition to be placed there, and was delighted when in December, 1900, she was notified that she had been promoted to be

one of its Supervisors. She states that the period there, during which she was advanced to Senior Supervisor, was one of the happiest in her telephone career. It is certain that she was most successful in the training of learners, her ready sympathies going very far to assist in imparting knowledge and dealing with the various dispositions which came under her care.

On Oct. 7, 1907, she was promoted to her present position as Clerk-in-Charge of the Bank Exchange, where her success has been maintained and her work much appreciated by her chiefs. The "Bank" is unique inasmuch as it is the only flat board exchange remaining in London. The subscribers at present number about 2,000 with 374 outgoing junctions, and the staff, including supervisors, is 98.

One might almost say that Miss Reekie's recreation is found in work. She is one of the vice-chairmen of the London Telephone Operators' Society, a member of the committee of the Staff Benevolent Society, one of the Company's delegates to the Hospital Saturday Fund, and a very hard-working member of that fund's surgical appliance committee. Whatever she undertakes she enters into with whole-hearted enthusiasm, and the successful whist drives which have added considerably to the coffers of the Hospital Saturday Fund, Life Boat and Fresh Air Funds, and the Staff Benevolent Society, during the past two winters, have been held under her organisation. She merits the sincere respect and affection with which she is regarded by her staff, and has made many friends in the Service.

#### LXXXIII.—BLANCH READ.

MISS READ, who is the Clerk-in-Charge of the Company's exchange in the ancient city of Coventry, entered the Company's service there in March 1898, and has risen through the various grades to her present position. The exchange is three times the size that it was when Miss Read started, having grown from just over 300 to over 900 subscribers. She has had the unusual experience of working under the one district manager during the whole of her period of service. Her duties have always had a



BLANCH READ.

strong fascination for Miss Read, and she spares no pains to achieve good results and to maintain harmony amongst both subscribers and the staff.

Miss Read's recreation is really change of occupation, as she is fond of nursing and finds opportunities for exercising her talents in this direction. If an exhibition of fancy work executed by the members of the operating staffs throughout the country were held, it is probable that Miss Read's place in the prize list would be a high one.

#### LOCAL OFFICE WORK.\*

By W. H. TAYLOR, Bath.

IN opening, I should perhaps explain that this paper has been made as elementary as possible, and all abbreviations or technicalities have been omitted, or, in the few cases where they are included, fully explained, since it is, I take it, the object of these societies to make the meetings as interesting to one branch of the staff as to another, and not to specialise or talk "over the heads" of the majority of the members.

The work of a local office cannot be split strictly into sections as can that of a larger office; it may be described as a multitude of details, the garnering of which provides work for the district office mill.

This is possibly the reason why local office work seems so full of interest, in that there is little routine and a great deal of variety, partly due to an almost constant procession of the public in and out of the office.

In addition, the local office clerk with an enquiring turn of mind is privileged to learn portions of all branches of the Company's work—with the practical side through the stores work and the technical portion through the circulars, plans, estimates, and proposals passing through the office. Given suitable material for the foundation, this, combined with a further technical training through the medium of the Correspondence Classes, should have the effect of producing a thoroughly efficient unit, a good "all round" man.

Now look at another side of the picture, and compare the foregoing with the humdrum, stagnant monotony of the days in the business career of the average commercial clerk, whose imagination is chained to columns of figures in huge and just as dreary ledgers, maybe further harnessed to the musty traditions of the old-fashioned British firm—an enterprising undertaking of the style that steadfastly declines to have a telephone installed on the grounds that they "have managed very well so far without it" and "Our business is of too important and confidential a nature to use a telephone," and so on, and obstinately declines to be convinced to the contrary.

The little routine work consists of the various returns—daily, weekly, monthly, and quarterly—perhaps some of the most important, owing to their frequency and the quantity of detail they contain, being the weekly reports. These deal with such varied subjects as the sale of metaphones, the employment of the gargs, subscribers disconnected for non-payment or other reasons, two-party subscribers working singly, junction faults, roof repairs and reconstruction works, the state of the inspections made of subscribers' telephones, staff late or absent from any cause, the tests made on limited rate tickets recorded by the operators, new business obtained, and, finally, a general *précis* of the miscellaneous items dealt with during the week.

Requisitions for stores, though not returns, yet occupy their little space in the weekly round. Their preparation involves careful scrutiny of the stores, and, when a list of the requirements has been obtained, due consideration of the exact quantity necessary to clear the orders in hand and allow a small margin for contingencies. Then, resplendent in the glory of Stock List numbers and descriptions, and the most exhaustive data as to quantities, destination, etc., instead of the bald and cryptic abbreviations of the local office, the forms are sent to the district office, where are evolved the finished requisitions—sometimes "finished" in more senses than one if the local manager has ventured to "foresee" too far ahead. The greater quantity of the stores asked for can be sent on at once, by an arrangement introduced a year or two ago which enables the district to keep a good stock at a central point.

Stationery is differently managed, the requisitions being submitted monthly. An ingenious check is now kept on the supplies, and the revised system also facilitates ordering.

The only other returns of note are the monthly applications for the money estimated to be spent during the succeeding month in the

\* Paper read before the Bath Telephone Society.



erection and maintenance of inside and outside plant (though this again cannot perhaps be termed a "return"), and the quarterly engineering return, generally known as the "10a," which gives particulars of the capacities of switchboards and each class of subscribers', junction, service and record line connected thereto, as well as private lines, a schedule of subscribers' and junction mileage and a summary of the three months' faults for the centre.

The responsibilities attached to the local offices are not, I think, generally realised. In addition to cash, all stores and stationery (no inconsiderable item in centres such as this, with over 2,700 stations) is received and issued, the clerk in most cases being also the storekeeper. This entails the examination of all stores inward as they are delivered by the carrier, their entry on credit slips, checking the delivery and advice notes and later the carriage accounts, issuing as required by the engineering or electrical staff, or possibly transferring to another centre.

While speaking of stores transfers it would, I think, be well to extend the use of the gummed address label at present issued, but in a slightly altered form. The address of the recipient only is now printed, but a label printed as the present tie-on ones are, with "The National Telephone Co., Ltd.," added below, leaving the address to be written in, would probably be largely used and prove more economical. The postal authorities point out the risk of loss or delay through the use of tie-on labels. This would be obviated were a gummed label used: in fact, the printed linen and cartridge labels of the Company could be abolished in favour of blank ones and gummed address labels a trifle larger than at present.

The foregoing is a general summary of the work connected with the stores, and makes no mention, perhaps discreetly, of the bugbear of a storekeeper's (and presumably—though in a lesser degree—of a stores clerk's) existence, that hardy annual, the investigation of stock differences. Without much experience of other centres, one cannot claim to be an authority on the point, but personally I should view with grave suspicion a centre which could not produce its annual crop of excesses and deficits to while away the idle evening hours.

Regarding the line foremen's requisition book, may I suggest that future issues be slightly amended?

At present insulator bolts have invariably to be written in, since few jobs are carried out with only one kind of S.A. and S.I. bolt. By making the S.A. bolt the last item in the first column and prolonging the ruling the various bolts could be shown *ad lib*.

Arming or pole bolts could be transferred to the foot of the second column, and in any job where these were required the item could be "dittoed" as necessary, these being, in common with insulator bolts, rarely issued in one size only.

Jointing sleeves, which have now practically superseded solder, could be added as the last item of column three, also to be "dittoed" as required.

Regarding works orders, these are, as the name implies, orders to carry out certain works, and consist usually of two slips—pink, issued to the foreman, and blue, issued to the Fitting Department. This explanation may seem amusing to the clerical, engineering and electrical portions of the staff, but it must be borne in mind that the letters "W.O." (the usual code) convey no more meaning to the average operator than so much Greek.

Their importance will, however, be realised when it is understood that no work can be commenced without a works order, and a shortage of works orders means that the engineer, and in his turn the chief inspector, has to rack his brains to find employment for his men.

The issue of works orders rests generally with the district manager, as also does, through the cost clerk, the responsibility of seeing that the monthly estimates cover the expenditure to be made under the works orders sent to the local office.

In connection with the recording of works orders a labour slate, which is also, for some mysterious reason, called a "labour board," is kept in each local office, and on this the works order is posted on its receipt, together with the estimated man-hours. As the men proceed the time worked is posted up daily from the gang sheets and the engineer is enabled to see at a glance how the work stands and to keep it under control. Any serious difference between the estimated and worked man-hours has to be explained

on the works order. It sometimes happens that a refractory wayleave grantor delays the gang, and there are also numerous other causes of over-spending—rain and snowstorms for instance.

The author of the following paragraph in the Service Instructions had evidently experienced trouble in dealing with local managers and engineers in this respect:—"The labour slate is intended as an aid to, and not as a substitute for, personal supervision."

Regarding the checking of works orders, the line slip is examined and the mileage of wire and cable and details of poles and attachments are compared as far as possible with the engineering records—maps and mileage books. Also it is generally the case that the engineer has a good knowledge of the job from personal observation. The blue slip, which has to be filled in by the fitter personally, should be checked with the stores issue slip in the case of a new job, and compared with the subscriber's card if it is a cessation. It rests with the chief inspector to see that no apparatus is fitted that is not covered by the works order and that nothing is left at a subscriber's premises that should be recovered. In the latter event it is obvious that the subscriber's card forms a very inefficient check on the return stores, since only instruments and other principal portions of the apparatus are recorded. Of course, the storekeeper, in the great majority of cases, is aware of the main details of a subscriber's installation, and consequently knows what stores should be received from the inspector.

A list of works orders completed each day is sent to the district office the same night, the instrument, and as far as possible the line slips, after checking and posting to the testroom engineering and office records, being written off and attached.

Arrived at the district office, the completed works orders are first entered in the various returns after being numerically sorted, and are then carefully checked. The only exceptions are the "N." works orders, which first go to the rentals clerk, who despatches the accounts, or confirms that this has already been done from the "Daily report of works orders completed." The backs of the blue slips are compared with the instrument store slips, which together with the line slips, have been previously sorted into numerical order. The weight of wire, man-hours, and as many details as possible, are also examined, any discrepancy resulting in the return of the works order to the local office for explanation. This, it must be confessed, is preferable to its return by the auditor, though either is not usually creditable to the local staff. After a final scrutiny the works order is passed away to await audit.

Dealing with the examination of works orders, an extremely useful innovation is the printing on the back of the blue slip of a double column ruled off at intervals, indicating the various books and returns in which the works order is recorded. This obviates the "patchwork" appearance of the former completed works order. Instead of initials and figures scattered over the face and back of the slips, the necessary data are now collected at one point. Of the thirteen columns provided the first is used in the testroom, the following four in the local office, and the remainder in the district office. In addition, for "ceased" works orders, the credit slip number is added in several centres for reference.

Works orders may be divided according to allocation into "N." (new), "C." (ceasing), "O.C." (ordinary construction), "R.R.," "L.R." and "I.R." (roof, line and instrument repairs respectively), "F.I." (fire insurance), and "Rls.S." (removals according to a fixed quotation). In addition, there are sundry other heads, such as works orders issued monthly for ordinary and metaphone cash sales. These cover, as the titles infer, all the sales transactions for cash during that particular month. If, as sometimes happens, stores are sold to a well-known and responsible party without immediate payment, a works order is specially issued for the sale under this account, as is also the case when a request is received to repair such electrical apparatus as telephones, bells, medical coils, etc., which are not the property of the Company. Also orders for complete installations of telephones, bells or alarms, of which practically every pattern on the market is supplied by the Company, are dealt with under this heading.

Among the headings which have not been previously enumerated are those on works orders issued for special works, such as wholesale overhead and underground construction, and repairs to exchange premises carried out by the Company's own men. Sales



of scrap metal, old poles, and obsolete material of all kinds are treated under removals account, as also are lost tools.

The first (new) may be again split up into numerous sections and sub-sections—the various descriptions of exchange and extension lines (including private branch exchanges), private wires, extension bells of all kinds, extra receivers and plugs and jacks. It is obvious to anyone who has followed the foregoing explanation that “N.” works orders are solely those issued for work from which the Company derives a direct annual revenue. It will also, I think, be clear that “C.” or ceasing works orders are those issued for the recovery of the subscriber's apparatus previously mentioned. In short, “C.” is the exact reverse of “N.” and every cessation works order means the loss of so much annual revenue.

If several lines have to be run in the same direction at the same time it is allowable, to avoid duplication of stores issues and clerical work, to group the works orders, but this does not apply to private branch exchanges. There is an instruction that the works orders issued for these are not to be grouped with any other, as the cost of each has to be kept entirely separate. This is presumably for fire insurance purposes, since the subscriber on this system has to be requested to insure the Company's plant on the premises against destruction by fire. That the plant in question is often extremely costly is proved by the fact that a certain firm in the Western Province was advised that the fire insurance value of their internal private branch exchange apparatus was £375, and the values of a number of the huge Metropolitan exchanges (that at Selfridge's for instance) would undoubtedly make even this sum seem insignificant.

In the case of party lines a works order may not be issued until both agreements on a two-party or three on a four-party line are obtained.

Ordinary construction works orders are those issued for extensions to the Company's general plant; orders for “E.C.” or exchange construction cover the switchboard portion of the work when new exchanges are opened or extensions made to existing ones. Any accounts for damage to roofs, either through negligence or wear and tear, are charged to “roof repairs.”

Line and instrument repairs are each split up into two heads per month, termed ordinary and special maintenance. Such work as the removal of a pole through wayleave troubles or building operations, or its renewal, changing a subscriber's telephone, or any work needing an estimate is treated as special and not carried out under the general works orders for the month.

Reverting to lost tools, it will readily be believed that a foreman or inspector will prefer a new works order involving a week's work to one of this description, whether the amount to come out of his pocket is a few pence or several shillings. Whatever may be said against it, there is a good deal to be considered in favour of charging the man at fault for lost tools. It may be said that this is not viewing the matter from the men's standpoint, but on the facts there are few who would contend that the Company should themselves replace lost tools instead of the loser. Under the present arrangement they are charged at cost price, less an amount assessed by the engineer or chief inspector for depreciation due to wear and tear.

Fire insurance works orders are only issued in the event of any damage by fire or lightning to the Company's plant, the cost being subsequently claimed from the insurance company.

The final heading is “Removals S.” and applies to all orders where an agreement has been signed to carry out the work for a fixed sum in accordance with the Company's tariffs. It was formerly the practice to get subscribers to agree to pay the Company's out-of-pocket expenses, but though the present system involves slightly more work, in estimating the cost beforehand, it is undoubtedly more satisfactory, both to the subscriber and the Company.

A point which has of late years received considerable attention, particularly from the audit office, is the delay which sometimes takes place in fitting the instrument after the line portion of the work is completed. Years ago, in “the good old days” (which were the “bad old days” from a shareholder's point of view), a subscriber had to be contented if he had the service within a week.

As an illustration of the importance of such “details,” it may be stated that during the first half of 1910, 113 additional subscribers were connected in the Bath centre, and averaging these at £5 each

an aggregate annual revenue of £565 is obtained. Changes from ten-party lines to the measured service are included and extensions excluded. Suppose a day had been wasted on each of the new orders in question, and taking the exchanges in this centre as fairly representative ones, the loss of revenue would have amounted to £250 on the Company's 2,000 odd exchanges. The loss from a day's delay on an £8 order is nearly 6d., but even this small amount cannot be ignored when the thousands of stations annually connected by the Company are borne in mind.

It should be clearly understood that the foregoing figures are to some extent arbitrary and unofficial, but the importance of the gangs completing each order at the earliest possible moment, and of the fitters following close on the heels of the gangs, as it were, will, I think, be apparent.

Dealing with the fault card system, every subscriber (with the exception of those on party lines) has a separate card allotted him. On this the name, address, exchange number, date fitted and details of the installation are entered upon connection, the inspections and faults being entered up as they occur. Subscribers with more than one instrument have two cards, one for the foregoing details and the inspections, the other for faults. The colour of the card is an index to the class of circuit; for instance, green cards are used for party lines and blue for private lines.

The inspections are controlled by the streets directory cards, which are made out for each street or for a particular district in any town where the density of the telephones is not great.

Faults, whether reported by the subscriber direct to the office by means of a fault form from the out-centres, or through the clerk-in-charge, are posted up on receipt and the card withheld from the cabinet until the trouble is reported clear, when the daily totals are entered in the complaint summary.

Cards are printed only for subscribers' and junction circuits, and it is not, I think, the intention that faults occurring on the equipment common to the whole switchboard, such as cords, keys, generators, etc., should be dealt with except through the exchange complaint register, and that alone. This should contain full details of the trouble cleared, a stroke being entered in the “exchange fault” column and the total at the month-end transferred to the complaint summary.

As to the filing of correspondence, with the exception of one or two special files for numbered circular letters, fire insurances and other important matters, all papers are passed away on Shannon files in alphabetical order and are subsequently transferred to binding cases, one of which is reserved for each month. This system, presumably the general one, has the advantage of extreme simplicity and is obvious to the veriest novice in office routine.

Dealing with the delivery of the Post Office and junction fee accounts, I have personally always looked upon their issue by hand with disfavour, as tending to disorganise the regular work of the office. With the great increase in number during the past few years, however, some cheaper system than the post was essential and, as a saving of about £10 per annum is effected in Bath alone by the present arrangement, its advantages are too obvious to need discussion.

Turning now from accounts to the actual cash, it is interesting to note that no less than eight cash accounts, each one of which has to be kept distinct from the others, have to be dealt with in the office. The cash of two of these is collected from and administered on behalf of the staff—a touching instance of faith in the Clerical Department.

The official accounts (using the word in its strictest sense, since none of the cash dealt with is private) consist broadly of the petty cash, treated through the No. 5 return, and the cash taken from subscribers and others in payment of accounts for rentals, removals, sales, fees, etc., and dealt with through the cash delivery notes daily.

In passing, a few remarks on a portion of the latter may be of interest. In the Bath centre the collections from automatic boxes average about £34 per month, giving an annual total of nearly 100,000 coppers, and since these weigh considerably over three and a half tons it will be realised that even a day's collections are not always easily handled.

The receipts from trunk call offices average between £23 and £24 per month, the Company's share of this (roughly, five-twelfths)

working out at about £100 per annum for the 37 call offices in the centre. On the whole, call offices are no doubt a paying investment, and might probably be made even more so by a careful scrutiny and weeding out of those which are not largely patronised or are much used by people who could (and no doubt would) well afford a circuit of their own.

From the petty cash all accounts under £2 owing by the Company, wages and allowances—in fact, all disbursements which the local office is allowed to make—are paid. The weekly cheques considered necessary are requisitioned, two at a time, in advance through the district office, and the bank pays out the cash each Friday on receipt of an instruction from the secretary. On the completion of the wages statement from the attendance books and gang's time record, and the wages vouchers—which are a subdivided and condensed copy of the complete statement—the cash is made up for each member of the staff, the necessary deductions for the various funds being made in one operation. This, the most vital portion of the week's work to a large number of the staff, being over, the signed vouchers follow the No. 5 return with its attendant accounts and vouchers to the district office. It will probably be agreed that if Friday is an important day to most of the staff it is an extremely busy one for the clerical machinery.

It is not, I think, known to the majority of the staff that at no time may the cash from one account be used for the other. I remember one of the engineering staff engaged on underground work calling at the office during a miniature financial crisis for the cash to purchase some stores he wanted at once. He had been used to pay cash for everything in this way, and was considerably upset when, the balance being very low, he was told to have it booked, particularly as a small handful of gold was paid over the counter at the time he was waiting. The problem was beyond him.

Contract work is, of course, entirely under the Contract Department's management, but, so far as possible, a miniature contract department should be maintained in every local office. It is obvious that people on the spot must have a far better knowledge of the places to canvass and local developments which may lead to business than anyone else. It has been found very difficult here, and this trouble is probably common to most residential towns to obtain what may be termed a "preliminary footing" to introduce the service, and in this connection the value of the enquiries recorded by the operating staff cannot be overestimated. Mrs. Brown, who is "on," asks for Mrs. Jones, who probably belongs to the same political club. The latter lady is not connected, and the operator having enlightened the enquiring subscriber regarding Mrs. Jones' unfortunate state of civilised barbarism, makes a record for the contract manager. If the good lady fails to respond to the arguments applied, coupled to the implied reproach of the enquiry, she is evidently a hard nut to crack. Such instances could be indefinitely multiplied, but the imaginary one given will indicate the importance of the point and, I hope, encourage the operators to renewed efforts in gathering every scrap of information that might prove of use in getting new business. In particular, busy lines should be closely supervised and records taken if the traffic appears too heavy for the circuit or circuits rented, regular users of call offices, who in time become familiar to the operators, should be noted, and in short if there appears to be an opportunity at any time to add to the Company's earnings, in any direction or to any amount, it should not be lost.

### INVENTORY OF PLANT.

THE following alterations and additions have been made to the lists previously given in the JOURNAL:—

#### HEAD OFFICE STAFF.

Spooner, A. W., Clerk, Engineer-in-Chief's Dept.	..	Head Office.
Watkins, J. H. (Test Dept.)	..	" "
Harding, R. W. (Lines Dept.)	..	" "
McGuinness, F. J., Chief Clerk	..	late Birkenhead District.
Fairhead, J. W., Chief Clerk	..	Oldham.
French, F. C., Cost Clerk	..	Manchester.
Sinclair, A. M., Local Manager	..	Dumfries.
Constantine, H., Clerk	..	Leeds.

#### TRAVELLING STAFF.—Sectional Officers.

Wran, A. R., formerly Enumerator.		
Bell, R. W.	"	"
Padgett, W.	"	"
Blight, W.	"	"
Hood, J.	"	Clerk
Hufton, C. W.	"	Enumerator.
Frost, J.	"	"
Dipple, H. W.	"	"
Crompton, W., Lines Dept., Engineer-in-Chief's Dept.	..	Head Office.
Thyne, J. R., Confidential Clerk	..	Glasgow.

#### ENUMERATORS.

Downing, D. R. J., Local Manager	..	Colchester.
Crampton, G. H., Asst. Engineer	..	Southampton.
Hill, R. J., Instrument Insp.	..	Bristol.
Coyle, H. L., Inspector-in-Charge	..	Carnarvon.
Wall, W., Sw. board Staff	..	Head Office.
Barker, C. G., Engineer	..	"
Dickinson, H., Local Manager	..	Winchester.
Coles, W. H. A., Lineman Inspector	..	Bath.
Green, F. C., Engineering and Electrical	..	Bristol
Dilger, P., Switchboard Staff	..	Head Office.
Moore, E., Foreman	..	Hull.
Warnock, J., Local Manager	..	Peterhead.
Maxwell, A., Sub-Engineer	..	Edinburgh.
Bailey, G., Switchboard Staff	..	Head Office.
Borland, J., " "	..	" "
Payton, G. A., Divl. Constn. Electn.	..	Met. Dist.
Jones, A. E., Local Manager	..	Grimsby.
Maggs, J., Inspector-in-Charge	..	Ascot.
Stewart, C. L., Exchange Insp.	..	Edinburgh.
Price, E. J., " "	..	Liverpool.

The following names should be deleted from previous lists:—

Cunningham, T., Enumerator.  
Barnes, T. M., "  
Harvey, T., "  
Simpson, A. E., Clerk.



### AN OUT OF THE WAY STAY.

By E. J. Woods, Margate.

THE above photograph may prove of interest to readers of the JOURNAL. The stay is in a very out of the way position and the staff have to go through a large private residence to get at it, which probably accounts for the condition not having been noticed previously. The tree has grown up between the screw and the side of the bow, forcing the former quite out of position, as is apparent. The indentation is much deeper on the other side of the tree, the screw being quite out of sight, being embedded in the trunk, which has attained a height of twelve feet.

Whether it will ultimately produce strangulation and kill the tree is open to question, but seems probable.

## PREPARATION OF "UNDERGROUND" DATA.

By E. J. Woods, Margate.

THE difficulty of showing graphically the details of cables to be provided, and the method of utilising all possible circuits to the best advantage, has been practically overcome by the method illustrated below. I may say that since first devised several centres have adopted the suggestion; and its possible usefulness generally led to this article being written.

When final plans are received from the Engineer-in-Chief, showing what cables are to be drawn in and the sizes of D.P.'s (i.e., number of pairs) approved, each cable or section of cable is drawn as per Fig. 1, which is self-explanatory.

Fig. 2 is then drawn, beginning with lines A to B and A to C, the latter being in a definite proportion to the number of pairs in the largest cable in the section. Consideration of Fig. 1 shows that the total pairs in the D.P.'s are more than in the main cable—i.e., 150 to 100—due to economic reasons not under consideration

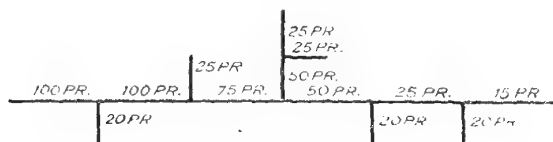


FIG. 1.

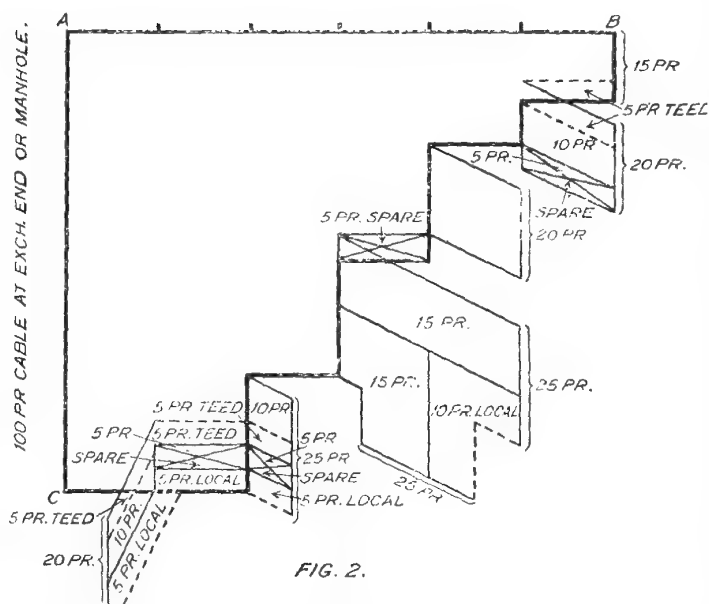


FIG. 2.

here. A knowledge of the locality comprised in each D.P. area will suggest where "teed" wires will be of use, as for example in party lines; or for an uncertain part of two adjacent sections which owing to wayleave questions may have to be reached from either D.P., both of which may be in the same area. In some cases "local" wires from one D.P. to another to accommodate private or extension lines may be of considerable service, besides being a saving of wire in main cables and of plant in the apparatus room at the exchange.

These points decided, it is a simple matter to draw this data in between B and C, allowing the same proportion of space to number of pairs at the D.P. The divisions on the line A and B roughly indicate the jointing points of the cables and the vertical lines under each give a full and clear statement of the nature of each joint. This facilitates the issuing of instructions to jointers and gives all requisite information for the ultimate completion of "cable circuit distribution" plans.

## DEATH OF MR. GUSTAV BYNG.

WE regret to record the death of Mr. Gustav Byng, of the General Electric Company, on Nov. 23 last, at his residence in Fitzjohn's Avenue, Hampstead, at the early age of 55. He was born in Bavaria in 1855 and, after being educated at the Augsburg Polytechnikum, came to this country at the age of eighteen, and in 1879 became a naturalised Englishman. He devoted his life to the development of the electrical industry in England and to the building up and expansion of the General Electric Company, which



flourished under his guidance until it now has branches and agencies in most of the important cities of the world. His name is associated with electrical signalling and with the advance of electric lighting, heating and cooking. He paid great attention to the construction and improvement of electric meters and many other electrical devices now in ordinary use. He was a member of the Institute of Electrical Engineers and of other technical and public bodies.

## TRAIN CONTROLLING BY TELEPHONE.

THE *Telephone Engineer* of Chicago, which devotes a good deal of attention to the application of the telephone to railway purposes, gives a table showing that the telephone is supplanting the telegraph even in the operation of manual block signalling. Altogether, 45,857 miles of road thus operated are controlled by telegraph as against 9,859 by telephone, which shows that the control of signals by telephone has made great progress in a very short time. The lines which have adopted it most extensively are the Atchison, Topeka and Santa Fe, 1,884 miles; Chicago, Burlington and Quincy, 3,004; Northern Pacific, 864; Pennsylvania system, 830; Norfolk and Western, 550; and Chicago and North-Western, 616 miles.

## INTRODUCTION OF THE MEASURED RATE IN GERMANY: THE NEW TELEPHONE RATE BILL.

ACCORDING to the *Zeitschrift für Schwachstromtechnik*, the Budget Committee of the Reichstag began the debate on this long-delayed and much-criticised measure on Dec. 6.



# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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[No. 58.]

## A RETROSPECT.

THE year 1910 has been a not uneventful one in the annals of telephony in this country. Whilst it has not been marked by any abnormal development of the system, or by any events of magnitude in the technical field, it nevertheless yields a record of substantial and, in all the circumstances, gratifying progress. For a corporation in the last year of its life the National Telephone Company, so far from being decrepit and inactive, has shown abundant signs of vigour, and has steadily fulfilled its mission in the development of the telephone service of this country. The number of telephone stations on its system has increased from 503,600 to an estimated figure of 534,300. In London the increase is from 120,900 to about 132,000, so that when the stations on the Post Office system are added it will be found that not less than 200,000 telephones existed on the London area at the end of the year. The number of new exchanges opened has been insignificant, but the supplemental heads of arrangement which were agreed during the year with the Post Office for facilitating the establishment of new exchanges in outlying districts of the Company's areas will tend to accelerate the telephone development of many rural districts and will probably result in an early and noticeable increase in the total number of exchanges. If, however, the actual increase in the number of exchanges is small, the work which has been accomplished in the direction of constructing new common battery exchanges of the most modern type in place of other equipments has been very great. Jointly with the Post Office such exchanges have been opened during the past year at Streatham (2,080 lines) and Birmingham (East and Northern). The Company itself has installed C.B. equipments at Wavertree (1,440 lines), Lee Green (1,300), Bootle (1,080), Edgbaston (1,000), Anfield, Trafford Park and Victoria (Birmingham), whilst the Post Office has installed on behalf of the Company a 4,200-line equipment at Cardiff.

Under a joint scheme common battery equipments are being installed at Clydebank and Cheetham Hill, and a large equipment for 3,820 lines is on order for Douglas Exchange (Glasgow). Extensions to common battery exchanges have been carried out by the Company at Hillhead (Glasgow) and Gerrard, Dalston and London Wall (London), and under a joint scheme an extension for 2,160 lines is being installed at Paddington.

Another step in the direction of the assimilation of the Company's system with the State, which will so soon be an accomplished fact, is the closing of duplicate exchanges in the Glasgow area. On the one hand the Post Office Western, Govan, Beardsden, Milngavie and Clarkston Exchanges have been closed and their subscribers transferred to the Company's exchanges, and, on the other, the Company's Cambuslang, Lenzie and Kirkintilloch Exchanges have been abolished and their subscribers' lines run into Post Office exchanges.

A work of stupendous character was embarked on during the latter months of the past year, and bids fair to occupy the whole attention of a large body of staff for a very long time to come. This is no less than a complete inventory of every kind and description of plant and property possessed by the Company and to be acquired by the State. When it is remembered that the Company's operations extend to nearly every county in the three kingdoms, that they have offices, buildings or exchanges of some sort in about 1,500 towns, villages or districts and pole routes of many thousands of miles in extent on highway and across country, some faint idea of the magnitude of this work can be conceived. A staff of upwards of 400 is at present engaged upon it.

Turning to the staff, the number of important changes which have taken place has not been great. The hand of death has fallen upon Mr. R. GILMOUR, District Manager at Edinburgh and long associated with Belfast, upon Mr. A. T. WALLER, a popular member of the London staff—both in the prime of life—and upon Mr. F. T. RUSHTON, a solicitor at Head Office. A very old servant was lost to the Company by retirement in Mr. TOM DONALDSON, Chief Mechanic, of Glasgow, responsible for the sound training of so many telephone men; and Mr. E. A. LAIDLAW, of the Engineer-in-Chief's staff, has left to take charge of the telephone department of the well-known firm of Siemens Brothers & Co. Amongst the promotions may be numbered those of Mr. WORTE from the District Managership of Hull to Edinburgh, of Mr. SWITHINBANK from Middlesbrough to Hull, and of Mr. A. ROBERTS, Chief Electrician at Liverpool, to the District Managership of Middlesbrough.

During the year the Greenock and Dumbarton districts were combined under the designation "West of Scotland," and the old Ayrshire and Dumfries districts under that of "South of Scotland." Mr. A. R. Lamb and Mr. G. A. Macdonald respectively were placed in charge of the enlarged districts.

The danger of dismissal which hung like a shadow over so many of the construction staff owing to the restrictions and threatened cessation of all development has been dispersed, and the considerate policy of the Board, referred to in our last issue, will relieve the anxiety of a large body of men.

The year 1910 was marked by the almost unprecedented occurrence of two General Elections in one and the same year. The

heavy additional work thereby thrown on all branches of the service, but especially on the traffic staff, showed the dependency placed on the telephone in all phases of public life.

The educational progress of the staff shows no signs of diminution, and the number of telephone societies is on the increase. An interesting feature of the past year in connection with these societies was the establishing of two prizes for the best essays under five different heads. The high quality of the winning papers, some of which have been published in these pages, affords the most gratifying evidence of the good work done in recent years by the various educational schemes of the Company, and of the excellent grasp of sound telephonic principles possessed by the writers.

Another work accomplished during the year was the classification of clerks, contract officers, draughtsmen, storekeepers, assistant and sub-engineers, inspectors and line and labour staff on a standard basis, with fixed maximum and minimum rates of pay.

As regards matters of interest outside the Company, the second International Congress of Government Telegraph and Telephone Engineers was held at Paris, at which many instructive papers on telephonic subjects were read, and at which the Company was represented by its Engineer-in-Chief. During the year the first loaded telephone cable laid in the sea was successfully placed in the Channel for the Post Office to form part of the trunk route between London and Paris. An interesting event worth recording was the presentation to Capt. Scott's expedition by the Company's staff of a special telephone equipment for use in South Polar regions.

### HIC ET UBIQUE.

WE were in error last month in stating that Miss E. K. Reynolds was the first lady to appear in a "List of Awards for Inventions and Suggestions." Miss Minter, London, and Miss Duggan, Dublin, both appeared in the list published in the July, 1908, issue.

ANOTHER operators' telephone society was inaugurated this season—namely, that at Southampton. The operators' societies, in fact, seem to have considerable vitality and awaken a lively interest in traffic problems in the rank and file which is equally to the benefit of themselves, the Company and the public. At the last meeting of the London Operators' Society debates took place on "Are Speed of Answer Tests Useful?" and "Should an Operator Answer One Call Immediately After Another?" (*i.e.*, before completing the first), and not only were papers by Miss Harriet Somers (Paddington), Miss Gertrude Berry (London Wall), Mr. A. Abbott (Birmingham) and Mr. T. Beck (Holborn) by which each debate was opened very excellent, but the animated criticisms which followed testified to the keenness of the other members of the society. There was an attendance of 236.

MR. H. LEGGE, formerly Engineer at Portsmouth, who is now at Para, Brazil, sends an interesting cutting from the *Electrical Review* of Oct. 26, 1889. It contains a paper read before the American Institute of Electrical Engineers, describing a visit to London in that year. The writer in a quasi-prophetic mood says:

The Post Office Department charges the telephone companies a regular royalty, it having been legally decided that the telephone is a "telegraph" within the meaning of the statute. The Postmaster-General apparently does not like the action of the companies in uniting, although none of them were competitive, but all working in distinct territories. There is no doubt, however, that he fears that the capitalisation will unnecessarily enlarge, and will be a big bite for the Government mouth whenever, and if ever, purchase may be decided upon.

It does not seem to me likely that the Postmaster-General will take any steps to harass the companies, nor do I believe that the Post Office Telegraph Department will care, for a long time to come, to trouble itself with telephony; and it is my opinion that the remaining telephone companies will soon in turn be absorbed or otherwise unite with the National Company.

Long line telephone work in Great Britain is, of course, limited by the size of the island and by the peculiar relative position of the large towns. I found very good talking between Birmingham and the several towns of Sheffield, Derby and Nottingham; between Glasgow and Edinburgh and Dundee; and especially fine from Sunderland to points upwards of 100 miles distant. For these latter distances circuits had to be artificially made up. In London there are necessarily many central telephone stations. No one who has not seen and studied London can form an idea of its vastness; and by reason of this vastness there will always be (notwithstanding the manifest excellencies of centralisation) a plurality of central stations connected by trunk lines, mainly converging to a principal trunk station, but supplemented by a sufficient number of trunks between such central stations as are adjacent to each other. Yet I should say that there are at present too many central stations and that they are too close together; and I am under the impression that the present management thinks so too, and will condense closely grouped central offices considerably.

Further on he commends the work of the British telephone engineer:

As to electrical construction outside, I may say, without hesitation, that the average is far above ours, whether telegraphic, telephonic or otherwise. The poles are no longer than are necessary, are uniformly well trimmed and painted, and, above all, are well stayed. Mile after mile I have ridden on a railway both in England and on the Continent, and found every pole "stayed," or, as we would say, "guyed." The cross arms are usually short, and project alternately a greater distance to one side or the other, that is, the upper cross arm may carry two insulators on the right side of the pole and but one on the left. While the next will reverse that, two being on the left and one on the right, and so on. The telephone companies had much housetop construction, but the same system of staying prevailed, so that the construction was superb, even though the roofs were all of the pitched variety. In Sunderland only, and the other towns where the Northern District Telephone Company holds sway, are to be found long cross arms *à la* American, the idea having been imported by Mr. Clay, who visited the United States a year or two ago, and who is a manager of the most progressive type.

### REVIEWS.

*Automatische Fernsprechsyste, von Arthur Bessey Smith und F. Aldendorff. Two volumes, 327 pages. (S. Heumann & Sohn, Berlin).*—This book is to a great extent a translation of articles by Prof. Smith which appeared in the *American Telephone Journal* and *Telephony*. The translator, Mr. Aldendorff, has appended descriptions of the Lorimer and of Clement's automanual systems so that the work may be comprehensive of the most important systems in the "automatic" world of to-day.

It is a descriptive treatise, very well illustrated, of the history of automatic telephony, commencing with the first American patent of Connolly and McTighe taken out in September, 1879, to the present time. The systems dealt with are those of J. G. Smith, Strowger, Ericsson, McDonough, Lorimer and Clement's automanual. Other systems of interest and connected with the development of these are also touched upon.

It is to be deprecated that comparative costs, as far as they relate to capital outlay and maintenance, of automatic, automanual and manual systems are not given, but such a descriptive treatise as this is to be recommended to all who desire a knowledge of the various systems now extant and who are interested in the development of the same.

*Die Automatische Telefonzentrale München-Schwabing.*—We have received from the *Zeitschrift für Schwachstromtechnik* a special reprint from that journal in pamphlet form of the articles by Mr. J. Baumann upon the "Automatic Telephone Exchange" at Schwabing, near Munich. The brochure describes this interesting exchange exhaustively, and contains 32 double column pages, illustrated very fully by 23 good diagrams and photographs. The price is 1 mark 50 pf.

### NOTICES.

REPRODUCTION on sunk art plates of the portraits of Messrs. A. B. Gilbert and A. Magnall are now ready. Those of Messrs. C. C. Wrote, C. W. Salmon and W. F. Taylor are on order. Price 6d. each.

## THE PSYCHOLOGY OF THE OFFICE.

By J. F. SCOTT, Glasgow.

*(Concluded from page 184.)*

We are given to repeating glibly that the subscriber's opinion is based on the treatment which he receives at our offices, but we give little real attention to those matters which count in conveying an impression. As each clerk is the specialist in his own particular work, it follows that he is constantly called upon to act as its interpreter to the subscriber. Now, our subscribers are not all philosophers—many require careful handling; and the incoherent explanations and tactless replies occasionally given do not tend to soothe feelings ruffled by supposed injustice. A junior was recently overheard endeavouring to calm an irate caller by preaching a sermon on the bad policy of losing one's temper. The result neither redounded to the credit of the individuals nor enhanced the Company's reputation. Our clerk can be a potent advocate for the Company and its methods, and he must seek to acquire the advocate's clearness of speech and ever-present tact.

To determine each individual quality necessary to evolve our ideal clerk—for we aim at the sky, though we may but reach the steeple spire—would be a tedious task, and this branch of our homily may fittingly close with a last exhortation. Many shrink from exhibiting initiative, from undertaking responsibility. Sometimes they trouble their superiors to pronounce judgment where a child's understanding were sufficient, and always they prefer to slip along in an old well-worn groove—it is so much easier, and, if fault be found, reference can be given to "the black sheep who did it first." It is a natural failing; but our duty is to master nature. If our clerk cannot justify any method he uses, the sooner he finds justification or a new method, the better for his reputation. If he will not elect to show himself equal to responsibility, he need not expect consideration when responsible posts become vacant.

The treatment of our next theme, *the clerk's duty to his fellow-clerks*, will be less definition than a plea for consideration. The present-day attitude tends towards Socialism, and this, as its adherents would explain, means the widest practical application of the motto, "Union is strength," an aphorism above contradiction. We want union. Office work is a relay race in which many runners are dependent upon each other's exertions. If one fail to exert himself, the whole contingent is delayed, and the stigma of defeat is applied to all. This is scarcely just, but usually there is an honourable disinclination to disclose the culprit. For the sake of his colleagues—perhaps a stronger incentive than the employer's weal—each clerk must see to it that he does not lag on the way. Consider how in office work all sub-departments are vitally interdependent, how the completion of one clerk's work often awaits facts and figures from others, and at once it is obvious that punctuality and a wider standpoint than the individualistic one are necessary if delay and disorganisation are to be avoided. Our clerk must be capable of thinking imperially, able to comprehend at least what is best for the office, if not for the complete organisation, and to carry it through, even although in some cases it may seem in contradistinction to an immediate interest. In the interest of all factors, we repeat WE WANT UNION.

In some circumstances it happens that a clerk has to consider the moral aspect before deciding his policy. An attempt to classify such instances would, of course, be useless, but it may be profitable to give an indication of their nature by outlining a few.

A common instance occurs when one is called upon to add a new duty to his routine work. The first instinct is to feel aggrieved, the second to search for some means of escape—the most obvious being the endeavour to convince by argument, sometimes sound but often otherwise, that the addition is more applicable to the work of some other clerk. The proper attitude is to ask and answer personally, "Is this within the scope of my duty?" "Am I the person best suited to perform it?" "Can I perform it without being eased of part of my present duty?" If an unprejudiced consideration negatives these questions the clerk must seek for justice at the hands of his superior; but let it first be looked to that the consideration given is unprejudiced.

Sometimes a clerk feels that his work has increased to such an extent that he can no longer adequately cope with it during business hours, and some find it hard to decide the correct course to pursue. An ambitious person, afraid that the confession may be misconstrued into a sign of incapability, hesitates to give in, and may prefer to struggle on at the sacrifice of part of his leisure time. One imbued with less worthy motives may actually seize the opportunity of working night and day with the hope that he may benefit by contrast with the failure of an unpractised successor. Both are manifestly wrong. The special effort of an experienced worker may stave off casualties for a little, but the inevitable breakdown will come. The increase must be made known; we owe it to ourselves, to our colleagues, and lastly to the Company, for breakdowns are more expensive than timely assistance.

From this point we naturally approach (although it scarcely comes under our present heading) the delicate question of payment for overtime worked by the clerical staff. The clerk urges that he is entitled to it, but it must be confessed that he is sometimes blind of one eye—the eye which should see the other side of the question. Office work is so elusive, and the time required for performing it is so difficult to gauge, that in the hands of an unscrupulous person payment for overtime might become a lucrative source of undeserved income. It is common knowledge that in offices where payment is made for tea or overtime the privilege is constantly abused. Let us make a distinction. The work of a clerk should be so arranged that he can perform it without undue pressure during ordinary business hours, and it is right that he should suffer for any failure. Special work and special circumstances require special treatment, however, and it is unfair that these should go unnoticed. The plea can be pressed too far; but the principle of recognising special late work in some way—as already existent in times of stock-taking and Directory proof-checking—might be extended slightly with profit to both parties.

Our consideration of *the relations between the office staff and other departments* will be brief, for it may serve to generalise. We do not appreciate each other as we should. Members of the technical departments vaguely surmise that the office has many important functions; but their closest contact with it is the receipt of wages, and this appeals so strongly that it overshadows all else. The clerk hazily recognises that the technical departments are indispensable; but, having palpable experience of their clerical makeshifts, he is apt to deem them necessary nuisances. These are, of course, exaggerated statements, but even exaggeration has its use in driving home a difficult truth. A simple cure for the evil is found in the cultivation of a more than departmental outlook and understanding.

The frequent shortcomings in records kept by technical departments demand special reference. The crux of the question is that the technical worker has only a dim consciousness of the fact that this matter is of paramount importance. To him the misquoting of a works order number or an inaccurate statement of material used or recovered may appear a slight and excusable error, but to some unfortunate clerk it means worry and ill-spaced time, and very possibly actual monetary loss to the Company. He must be brought to understand that his work goes for little if he cannot supply information which will enable its results to be realised.

This is superficial treatment, but the scope of the paper does not allow of further. We can but hope that to mention the matter is to awaken a keener consciousness of the need for improvement.

*In conclusion* a word of explanation is necessary. Some may hold that the writer has unjustifiably set himself on a pedestal from which to view the shortcomings of his colleagues. This charge is candidly met by the confession that external observation has gone hand in hand with introspection, and that the decisions arrived at by both methods have coincided. Others may argue that, since office men and methods have attained the highest standard known, such writings are but a modern exposition of the futile exercise of tilting at windmills. So far as they extol the progress made the writer agrees; so soon as they assume that the be-all and end-all is attained he parts issue. Much can yet be accomplished. The following excerpt from Mr. Hare's article on "Control" in the November JOURNAL, coming as it does from one who is conversant with the "inner mysteries," forms in itself sufficient justification for all that has been said:—"I am telling no secret when I say that



one of the most difficult tasks our management has to meet is to find a really competent chief clerk when a vacancy occurs—a man who possesses both knowledge and ability to control."

This paper has failed if it has not shown that the remedy for this evil is the improvement of those matters which lie nearest us. The whole is greater than its part. Given the improved minds, the improved methods will follow as a natural consequence. We may harness ourselves to the car of progress, and exult in the sense of something achieved; or we may suffer ourselves to be dragged along behind, hindering others, gathering dust, and bearing the jolts and jars consequent on our unenviable position.

The individual must make the choice!

## A KNOWLEDGE OF ELOCUTION AS AN AID TO TRANSMISSION.

By T. RODGER, *Glasgow.*

My attention has been directed lately to the beneficial effects on transmission of a knowledge of elocution, and it has occurred to me that the matter might best be brought before the staff and the public in the columns of the JOURNAL.

I recall a case where special observations necessitated that an officer of the Company should listen-in on an operator's position, and; owing to the bad effect on the transmission in this particular operator's case, it had to be abandoned. In talking over the matter with the electrician of the exchange, whose elocutionary attainments are good, he could tell who the operator was, and expressed the opinion that although few people are very deficient in this way it would certainly be conducive to better working if the staff, particularly the operating staff, knew better how to make the best use of their voices.

While experimenting with the first telephones made he found that while Mr. Watson, his assistant, could hear him, he could not hear Mr. Watson, and the reason he gives for this is that he had the elocutionary ability which Mr. Watson lacked.

An article on "The Telephone as an Educator" (extracted from the *New York Sun*), in the *Telephone Review*, of New York, gives the opinion of a teacher of elocution that the general improvement in enunciation in New York is a direct result of the universal telephone habit.

These have led me to suggest that the anticipated rapid development of the telephone in this country in the near future warrants more attention being given to the teaching of elocution by making it compulsory in our schools. Why leave this much needed improvement in our education to be taught us by the telephone habit? Much time, thought and money have been given to the study of the problem of transmission from the electrical point of view which would avail more if telephone users knew how to use their voices to the best purpose.

A little further reflection makes me suggest that the articulation and grouping of figures according to telephone practice should also be taught. It is also well-known that the carrying power over the telephone of many letters in the present alphabet is far from good or not good at all, and although it may not affect the present generation we might with advantage consider the adoption of an alphabet more in keeping with future requirements, when it is expected the telephone will have become as much a household necessity as light and water.

It would be interesting to know whether in the extended alphabet of 43 letters, which I believe our progressive Japanese allies are adopting, the telephone requirements are being met.

## ANXIOUS TO KNOW.

THE following letter was received by a district manager of the Michigan State Telephone Company in a district where the nationality of the settlers is evidently much mixed:—

How it may concern:

Please would you be kind to Talofon don to Wittaker to the Catalok Priest. Tall him that Heres is to Bohimien man that wanst gat maryd by the catalok priest and ask him if he woud do it and if he come to Milan or wee go don to Wittaker. And when Woud he do it what day. So please ask him whot woud he do and when.

## THE HEAD OFFICE DINNER.

ON Nov. 29 the staff at Head Office held a most successful dinner at the Holborn Restaurant. Mr. A. Watts of the Engineer-in-Chief's staff was in the chair and presided over a thoroughly representative company of nearly 200 including Mr. Franklin (the President) and the following chief officers:—Messrs. Anns, Gill, Cook, Hart, Phillips, Cotterell and Lowe. The most notable absentees were Messrs. Goddard, Clay and Hare, the first two owing, unfortunately, to ill-health and the latter to a previous engagement. An excellent musical programme had been arranged by Messrs. Darville and Baldwin. Mr. Catchpole (of the Secretary's office) gave a capital performance on the 'cello, and Messrs. Baldwin and Poultney looked after the accompaniments very satisfactorily. Of the professional artists Mr. Walter Walters and Miss Frances Roscorla were much appreciated.

After proposing the usual loyal toasts, Mr. WATTS, the Chairman (who had a most enthusiastic reception), in proposing the toast of the National Telephone Company, said that it was one which he was sure would be enthusiastically received by most of them; they all knew something of the history of the Company which had played so notable a part in the industrial and scientific development of their beloved country. They were all cognisant in their various departments of its present state and condition, and they knew also to a day and an hour that which is mercifully concealed from all of us in our individual lives, the date of its demise. Or perhaps he should not call it demise, but rather its glorification into a State Department.

Soon, very soon in these days which pass so quickly, so quickly because they had to press so much into the limit of a working day, the Company, of which it was their privilege to be servants, and which formed the subject of their present toast, would develop from the chrysalis stage of a limited company into the full, glorious, butterfly liberty of a branch of the national service, and so, when shadows fell, it was meet and fitting that they should honour it at that, the first dinner of the Head Office staff.

He could well have wished that one of their chiefs had been chosen to perform the duty which had fallen to his lot, for in their hands he knew the toast would have had fuller justice done to it than he could possibly hope to achieve. But it may have been thought more fitting that, as they went out of active service when the deathknell of the Company sounded, none of them should propose that toast lest, overcome by mournful reflections, the conviviality of their gathering might suffer.

And while, therefore, it had fallen to his unworthy self to propose that toast, it gave him great pleasure indeed to see so many of their chiefs with them there. It might be that in addition to the general purpose of the gathering some little spark of curiosity might have impelled their presence there to-night to see how those who did not retire might be able to comport themselves when they were set free from the tutelage of their lords and masters. (Laughter.)

Their chiefs knew them, the members of Head Office staff, well, they knew their work and doubtless they knew their faults and failings too. He was sure they must often have smiled at them, for it was a common failing of each member of the staff, from the top to the veriest office boy, to consider that he was the Company and that without him the whole business would collapse and come to a standstill. That failing of theirs might be explained if not completely accounted for by the fascination of telephone work, and it could certainly only be because of that fascination that they found the members at all times willing to work overtime with no ulterior motive than the reward that comes from work well and faithfully done.

Even when the remuneration had been inadequate that personal interest in the Company's welfare had ever been present, and he was sure that in this direction they had had the Company's benediction and blessing. And yet, though they had sometimes thought that they had occasion to grumble at the Company owing to the lack of appreciation as evidenced in their insufficient remuneration, it was with somewhat mixed feelings that they looked forward to the new state of affairs.

Changes were lightsome, it was said, but in the present circumstances they rather considered them to be burdensome. For whatever it did mean, it certainly must mean new chiefs for them, and while they had got their present chiefs, educated up to their standards so that they could endure, aye and had even grown to like them—(loud laughter)—it was no light matter to commence their work all over again, especially with a set of fresh men whose knowledge of telephone matters and administration must necessarily be limited and whose methods could not be otherwise than radically different from the methods of their previous chiefs.

Everything hitherto had been considered from the standpoint of: "Will it pay?" whereas their new queries would ever be: "Is it in accordance with the Regulations and Rules of the Department?"

There was therefore a somewhat anxious time at present and they now were waiting for the promise made by Lord Stanley of equivalent work and equivalent pay to materialise.

The Postmasters General, however, came and went and even now the present Postmaster-General might be making his final bow to his national audience, so that no matter how anxious they might be they had no alternative to the Prime Minister's dictum: "Wait and see."

One thing, however, had been strange, passing strange, nay, rather, quite incomprehensible to many of them, in connection with the transfer of the Company's affairs, viz., the compulsory retirement of so many of their chiefs with whom they had worked so loyally and, he thought he might claim, so economically and so successfully.

The ways of Governments were past finding out, but when they found heads of departments cashiered at the time of transition of such a complicated and intricate business as the National Telephone Company, for no other apparent reason than that they were in receipt of salaries over £700 per annum, well then he thought the limit of foolishness had been reached.

Had there been any claim as to extravagance either in numbers of chief

officials or in their remuneration some explanation, if not excuse, could have been offered for this drastic treatment, but when it was universally allowed that the business could not have been conducted more economically and more efficiently than it had been, then he did say that there was "something rotten in the state of Denmark" when it acted in this incomprehensible fashion.

If they turned now from the treatment meted out to their chiefs to the prospects of the Company itself before it finally expired, they could easily espy unlimited work for them in the near future.

He was credibly informed that already active operations had commenced in various parts of the country for enumerating all the tangible effects accruing to the Company, and as the time for the transfer drew near, wagon load after wagon-load of field forms and schedules under suitable escort would arrive at headquarters.

To agree the quantities and values of all these effects with the officers of State was no easy matter; the opinions given and the views expressed by both sides were likely to be widely divergent, and it would probably facilitate a speedier agreement were it possible to act on the advice of the learned professors of the ancient city of Lagado.

Their advice was as follows:—You took a number of the leaders of either party, you disposed them into couples of such whose heads are nearest to a size, then let *two nice operators* saw off the occiput of each couple at the same time, in such a manner that the brain was equally divided. Let the occiputs cut off be interchanged, applying each to the head of the opposite party man. It seemed indeed a work that required some exactness; but if it were dexterously performed the results would be infallible, for the two half-brains, being left to debate the matter between themselves in the space of one skull, would soon come to a good understanding.

What an excellent thing it would have been if even one man could have been found with a brain so evenly balanced that justice might have been done to both parties without this long drawn-out period of suspense—a period which had hampered the development of the telephone service and had been fraught with anxiety to shareholders, directors and chief officers alike. With regard to the general staff, it is true they had been promised work after the transfer, but many of them had been in peril of losing the means of subsistence until that time. Fortunately, owing to the generosity of their Board of Directors, urged no doubt by their sympathetic President, the peril had been averted. (Cheers.)

They honoured the National Telephone Company; they admired it for its pioneer work and for the upbuilding of such a successful and well-organised business. They acknowledged with pride the value it has been to the nation, to the business world, and to the community at large, and he asked them to be understanding and drink with all the enthusiasm at their command the toast he had the honour to submit to them, the National Telephone Company, Limited, with which he coupled the name of their esteemed President, Mr. George Franklin. (Cheers.)

MR. FRANKLIN, the President (who was received with loud cheers), said he would indeed be irresponsible if he did not at once acknowledge in the fullest possible way not merely the toast but also the kind wishes which had met with such a great response from them. When he thought of that meeting which they were holding and of the many other meetings which were going on in the country, where possibly the talk was about guarantees and Second Chambers, he was glad that the Head Office staff had inaugurated even at the eleventh hour of the Company's existence such a charming and agreeable function as that Head Office dinner was. With a chairman like Mr. Watts he ventured to think little was required for the mental side, and the musical side, judging from the programme, was in every way agreeable. He noticed that they had a song "Good-bye" on the programme, but he hoped this would not apply to the long connection between the Company and its staff. He would only say he did not quite share the chairman's miserable foreboding. During the 30 years of the Company's existence he ventured to think no company had ever deserved better of the British public. (Cheers.) No company had ever come off with a poorer reward—from early in their history an exaction of 10 per cent. for no service at all had been made. There was reason to be thankful that the Company had been able to make the progress it had. The service which it had given to the public was not to be discredited as compared with other services in different parts of the country or the world. With regard to this service of the National Telephone Company, both he and his colleagues freely and gladly acknowledged the splendid service given to the Company by its staff. He had said on other occasions, and he did not mind repeating it then, that the National Telephone Company owed a debt to the staff of the Company much beyond the monthly salary compensation sent out. But he had to refer to the difficulties which the Company had had to face. Those difficulties had not been light, and had required most serious consideration, and if at times it had seemed to the staff that the shareholding part of the enterprise got a little more than its share, he ventured to remind them that capital was necessary to a telephone undertaking, and without reasonable compensation and reasonable dividend capital would not come into the concern and therefore employment would not have followed. With regard to this Company other difficulties loomed ahead. At the end of the next year its license closed—possibly its history would close also. One of the difficulties had been the question of capital expenditure. The telephone enterprise constantly required the expenditure of new money. The Company having a license limited by years is not in a position to expend that money because there is nothing to be got out of it, whilst the agreement with the Post Office made no provision for dealing with expenditure of that kind. Some two or three years ago the Directors were face to face with the question: What shall we do with regard to capital expenditure? The interests of the shareholders required that expenditure should not go on—there was no object in providing capital expenditure for the benefit of the Postmaster-General, who did nothing whatever to earn it—and so it was that the Directors came to the decision (with great sadness) that the right thing to do was to curtail this expenditure. Some two years had passed since

that decision was come to. Some hundreds of honest working men of the Telephone Company had had to seek employment elsewhere in consequence. Now only recently, from a further study of this question which was not possible at an earlier date, in the light of events as they stood to-day, he was able to advise the Directors that if they would pursue a certain policy with regard to the development of the undertaking they might be able to safeguard the interest of those who otherwise would be in jeopardy and probably have lost their employment. He looked upon the decision as one of the most momentous of his life—these men within thirteen months of employment guaranteed by the Postmaster-General, and yet face to face with the question of whether they should be retained on the staff. He was happy that his colleagues had seen it in the same light as he had seen it, and they had come to the conclusion that come what would, although some sacrifice was involved, the staff was not to be sacrificed, but should be retained right up to the termination of the license. (Great cheering.) He trusted he might be with them as a guest on some future occasion, so that they might take counsel together. An opportunity of a gathering of that kind that they would be able to meet each other face to face, and exchange a friendly word or two, and long after the Company had ceased to exist, and they had all become sober Post Office officials, bound up in the most beautiful pink tape. He ventured to think they would look back to those happy days when, as officers of the National Telephone Company, they worked with spirit and goodwill for that Company, and it would be some pleasure in those days to feel the grasp of the hands of those who have met before in friendship. He noticed the chairman referred gloomily to the discharge of their chiefs. He had often heard of it, but the chairman was anticipating a little. He believed the Postmaster-General had until June, 1911, within which to say which of the staff he wanted. They did know that there were many in the position of having to go over to the Post Office under Lord Stanley's declaration. He agreed with the chairman that it should not be limited to a question of salary—questions of policy, administrative skill, and skill in other directions necessary for the development of the enterprise would arise for the Postmaster-General and the Government of the country as they had done in the days of the National Telephone Company. If any evidence were wanted of the admirable spirit amongst the staff of that Company he would point to what had been accomplished recently in the organisation of the Inventory staff, which had entered upon a task never entered upon before. Nothing could be better than the spirit which had been shown by the staff in relation to that inventory. He ventured to think that the staff who have applied themselves to the inventory would take care that every single piece of plant was enumerated in that inventory, and it would not be possible for the Post Office officials to remind them of some plant to be included. This he did know, that those who were working on the inventory were working in a thoroughly sympathetic spirit and would take care the Company got its rights—He often thought the Company had every right to be appreciative of the great services which had been rendered by their staff to the shareholders. The shareholders' interest in the concern was now in the direction of vanishing point. Sometimes he believed that not only the staff but the public, in the coming time, would look back upon those possibly happier days when the telephone was being worked by the National Telephone Company. He wished, on behalf of the Board, to thank them for the kind reception they had given him and for the applause which had greeted the kind words of the chairman in proposing that toast. (Cheers.)

MR. CAFARN, in proposing the health of the chairman, said the committee had found some difficulty in the selection of a chairman. They would have been most pleased to see one of the great chiefs in the chair, but the latter considered that one of the staff, pure and simple, should occupy that post. After some show of diffidence on the part of one or two, Mr. Watts, after a little gentle pressure, was induced to accept it. He thought the committee's choice had been thoroughly justified, and it was not the first time Mr. Watts had stepped into the breach. The gathering had come far too late—it ought to have come years ago. They in Head Office, divided as they were into various departments, did not have proper opportunities of getting to know one another individually. The Head Office staff were the best of good fellows, and he wished they had had more such opportunities in the past. Their late great General Manager, Mr. Gaine, had spoken of *esprit de corps* in the first issue of the JOURNAL. Generally no *esprit de corps* could exist without *camaraderie*. He hoped they would gather there next year and find themselves even better comrades and better friends than hitherto. They could congratulate themselves on that gathering. Another aspect of the gathering which might be a happy omen was the juncture at which it was held. Very soon they would be sending out the forms bearing the heading, "Annual increase." (Cheers.) And what a splendid chance a general parade such as they had that evening given the chiefs, from Mr. Franklin downward, of seeing what a grand lot of men their staff were.

He would say once again that they could congratulate themselves on the success of that evening, and they could congratulate themselves on their first chairman. He thought also Mr. Watts could congratulate himself on the honour of having presided over the first Head Office dinner. (Cheers.)

MR. WATTS having responded, a very enjoyable function was brought to a close.

#### PRESENTATION TO MR. & MRS. OWEN.

At the monthly meeting of the Bath Telephone Society an interesting function to mark the celebration of the silver wedding of Mr. W. C. Owen (Local Manager) and Mrs. Owen took place. Miss Weeks, Clerk-in-Charge Bath, in making the presentation of a handsome silver spirit kettle, stand and lamp (supplied and engraved by Messrs. Hayward Bros., Bath), voiced the congratulations of the staff in a neat little speech, to which Mr. and Mrs. Owen suitably replied.

## A YEAR'S GROWTH OF THE TELEPHONE.

## AUSTRALIA.

SINCE the article published last month later statistics with regard to Australia are now obtainable, which show that the Commonwealth now possesses 75,870 telephone stations. They are distributed in the principal States as follows:—

New South Wales	...	...	31,888
Victoria	...	...	21,112
Queensland	...	...	7,256
South Australia	...	...	6,606
Western Australia	...	...	6,514
Tasmania	...	...	2,494

75,870

These, added to the 29,681 stations in New Zealand, make the total number of telephones in Australasia 105,551 instead of over 80,000 as estimated, and increase the total for the world to some 10,341,000.

The development of the principal cities in Australia is shown in the following table:—

	Beginning of	
	1909.	1910.
Sydney area	16,392	18,239
Melbourne area	—	16,778
Adelaide	—	4,816
Brisbane	—	2,698
Perth	2,554	2,752
Newcastle area	828	897
Ballarat	—	794

Melbourne is therefore an addition to the list of towns with over 10,000 telephones.

## CORRESPONDENCE.

## DISTRICT OFFICE STORES BOOKKEEPING.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. SARGENT in his letter to the JOURNAL last month on the subject of "District Office Stores Bookkeeping" shows, in his remarks re the omission of the instruction from the latest issue of S.I. B.1 to "show in proper column of requisition the quantity in stock and on requisition undelivered," a misconception as regards the scope of the Service Instruction book. In the particular case in question the requisition form itself has headings (amongst which is included the heading referred to by your correspondent) for certain information to be filled in by the district before same is forwarded to Head Office, and it was obviously superfluous for the Service Instruction book to continue to reiterate that these headings must be filled in.

London, Dec. 14.

PERCY CHESTER.

## CABLE FAULTS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

IN response to Mr. Gillmore's inquiry regarding methods of dealing with cable faults, two cases of locating faults are given below; the actual steps taken being described with a view to making the matter more interesting.

The whole of the subscribers' lines on a D.P. were reported "earth" at 7 a.m., and as water-pipe-laying operations had been noticed a few days previously in the vicinity of the D.P., it was at first thought the cable pipe had been damaged. On reaching the spot, it was found that the water-pipe trench was deeper than the cable pipe, but the latter appeared quite sound. The D.P. being only 3 yards from the water-trench, the footpath near the foot of the D.P. was opened, and a split bend exposed (the Corporation permit to open the ground was not obtained until two hours later, but the case being an "emergency," no difficulty was raised).

On opening the "split," which was higher at one end than the other, the pipe was found to be flooded with water, extending up to the centre of the lead sleeve. The water was ladled out, and a blow lamp applied to sweat off the lead sleeve. The highest wiped joint was removed all right, but the lower wipe which had been covered by the water had a slightly pitted or spongy appearance, and began to bubble when heated. The bubbling was not altogether from water, but seemed to be also due to air, as little globules of solder were noticed to form and break. When the sleeve was removed, it was found that the water had saturated the paper insulation up to and including the paper sleeves.

A split bend at the opposite side of the road (14 yards away) was then opened, the cable cut into, and the faulty length drawn out, with a "drawing-in" wire following it through the pipe. It was found afterwards that the water had extended 11 feet along the cable from the faulty joint.

A piece of good cable was drawn in, and a through joint made at the second split bend. The pairs were then verified at the first "split" to the exchange and to the D.P., and a second joint made, completing the repairs.

The flooding of the cable was not accounted for until it was noticed that amongst the water pipe gang's material there was a much battered length of lead

pipe. This was apparently part of a service pipe which had been burst, and it is surmised that as the "split" containing the faulty joint was situated partly under the kerbstone and gutter the water from the burst pipe had gradually soaked through the soil and thus reached the spongy wipe.

In the second case, it was urgently desired to join up a new subscriber on the only remaining spare pair of a 50-pair cable. An earth-connected buzzer was put on the spare at the exchange, and the required circuit picked up by an earth-connected receiver at the chamber nearest the subscriber's house. On further test, a short circuit appeared on the loop. With the Silvertown test-set the conductor resistance of the loop from exchange to the fault was obtained, but as the exact proportion of 20-lb. and 10-lb. conductors in the section under test was not known, another C.R. test was taken from the subscriber's end. The result gave the short circuit at 779 yards distance, and as the route had been carefully stepped on the road out to the house, it was found that a brick chamber existed 780 yards away. On opening the joint at this place it was seen that the paper sleeves on the faulty loop had been slightly misplaced, allowing the wires to touch each other. The sleeves were put in proper position, and the circuit then tested "O.K."

Greenock, Dec. 10.

JOSEPH V. ELLIOTT, Engineer.

## ENTHUSIASM AND ENERGY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

AFTER reading Mr. Nick's article on the above subject in the September JOURNAL, one was almost forced to put the question, "What is Enthusiasm?" I am quite prepared to admit with Mr. S. G. Hare that there is a great amount of truth in what he says. At the same time this is not the fault of enthusiasm. Shakespeare wrote a play about Julius Caesar, the student and fighter who studied war till he knew it thoroughly, and then used his knowledge to make himself boss of Jove's footstool. One of the characters in the play—an energetic gentleman named Cassius—is made to say "The fault, dear Brutus, is not in our stars, but in ourselves." I think the same applies here; it is not the fault of enthusiasm, but ourselves who do not apply enthusiasm in its proper sense. What is enthusiasm? Mr. Nick says that "an enthusiast" is one who imagines that he has a special converse with the Almighty, or a special communication with Him. Is this correct?

In my opinion enthusiasm is *not* only to be used in connection with religion, poetry, patriotism, duty and such high matters as stated in the editorial under the heading of "False Enthusiasm."

The word enthusiasm is derived from *en* and *theos*, two Greek words meaning that the possessor has divine inspiration; but as *theos* is Greek, why not take it in its Greek sense as not applying to a god, but to gods? Thus, a man might not only be inspired with some fire of the Almighty, but with any of the gods. For instance, a man might be inspired with some fire of Mars and be an enthusiastic warrior, of Bacchus and be an enthusiastic drinker, of Apollo and be an enthusiastic hunter.

Enthusiasm, in my opinion, is what makes the world beautiful. Only when an artist is divinely inspired can he produce the pictures that delight the world. Only when a poet is thoroughly enthusiastic can he produce his great masterpieces. When a man is thoroughly enthusiastic he can do his very best work in the shortest time. Can this be a drawback?

On the other hand, some people are gifted with such vivid imagination that their ambition overbalances their judgment; their enthusiasm (?) paints more gilt than detail into the picture of the future. Others are too critical of the little things of the daily life and miss the larger outline.

To be "an enthusiast" it is not necessary to stand on the housetop and tell everyone what you are doing, and to make people believe that the only way to do anything right is the way you or your staff do it. Such men as these cannot be classed as enthusiasts, but as men wrapped in their own conceit.

A thorough enthusiast is one who tries to obtain all the knowledge possible, and is never above getting anyone's opinion or consulting his subordinates and getting their ideas on any point previous to bringing it into practice. I think this is a very important point for officials to consider, as I am certain that if you take the staff into your consideration and ask them what they think on any matter they at once realise that they are supposed to know something, and consequently they realise their responsibility, with the result that more energy and thought is put into the work.

Of course, what is wanted is a combination of the plodder and the enthusiast. Here we have inspiration and originality, together with hard work and perseverance.

If we are to attain our ambition we must realise that nothing is "good enough" except our best, and the more we develop the better our "best" becomes.

ALBERT E. RYLAND.

## SOME SUGGESTIONS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

AS the JOURNAL encourages any of the Company's employees to give expression to what may occur to them in the course of their daily work, regardless of whether it is in one's particular sphere or not, I venture to make one or two comments.

I. I have always thought it might be useful if ringing connection were maintained between two subscribers when, either by intent or neglect, the receiver is off the hook and not actually in use. For example, in business, when making a call, one sometimes has to await the arrival of the person required, or to wait indefinitely while information is being obtained; and it may occur, agreeable to the law of contrariety, that no sooner is the call made than the query in some way or other is solved, or perhaps urgency of other business necessitates the call being dropped prematurely. Now, in such cases, it seems to me it would be advantageous and certainly a saving of time to be able instantly to attract the attention of the other end, independently of the Exchange. How far this is practicable, I am not in a position to say, but since mentioning the matter at a telephone lecture, I have been agreeably surprised to



hear a warning tinkle occasionally, on one of our telephones in the office, apparently denoting that the caller is getting impatient.

2. I do not think the use of guide lines on account forms or books is sufficiently recognised. For instance, on H.O. debits, Schedule 506, could not the *f. s. d.* columns be made more distinctive, either by the lines being thinner, or by a double line separating S.L. No. from *f*? This may seem a trifling matter, but I have to own to being once caught mistaking one column for another. I might not have mentioned this but for the fact that my successor in that work did likewise. Now, as any mistake of this kind means a considerable loss of time at the critical moment when the No. 6 return is being made up, it becomes a matter of more importance than at first appears. Then again, as another instance, it is all very well for those accustomed to the work to say they can at once drop on any particular one of the twenty or more columns on the ledger cards and analysis sheets, but the absence of guide lines makes it unnecessarily troublesome to a new hand.

3. My third and, perhaps, most seasonable remark is respecting ventilation. While fully appreciating a fine new office to work in, as we have at Dalston, the unavoidable occurrence of occasional draughts leads me, in my simplicity, to wonder why construction folks cannot provide for the proper ventilation of buildings apart from the ordinary use of windows and doors. We have radiators for warming the atmosphere; cannot some device be found, in these days of the perfection of science, for the introduction of fresh and outlet of bad air, other than by the above ordinary means? As it is, some unfortunate clerks less favourably situated than we are have no alternative between working in unhealthy atmosphere and being subject to draughts, or the inconvenience of having papers blown about the office. I trust you will not take this in the light of a personal complaint, but simply a wish to take advantage of the opportunity afforded by the NATIONAL TELEPHONE JOURNAL to ventilate an idea which has long been in my mind, and which would equally apply to all the habitations of man.

Metropolitan Stores Office, Kingsland Green,  
Dalston, N.E., Nov. 30.

E. G. ADENEY.

### LONDON NOTES.

A NEW C.B. installation has just been fitted by the Company for Messrs. Thos. Cook & Son, the noted tourist agents. The new equipment consists of three 250 line sections, multiple type, and replaces two 50-line magneto boards. As a considerable proportion of the lines are external extensions, the equipment has been specially designed to provide for them. Another private branch exchange recently installed is that for Messrs. Arding & Hobbs at Clapham Junction. This is noteworthy as indicating the up-to-date nature of everything in the splendid new building which has been erected to replace that destroyed in the disastrous fire of a year ago.

MR. H. GREEN, of the Engineer-in-Chief's staff, read his prize paper on "The Designing of Dry-Core Telephone Cables" at the last meeting of the London Telephone Society. The audience, if not so large as one would have liked to see, was very appreciative. The subject is so important to the telephone engineer, and was treated so lucidly by the lecturer, that there ought to have been a full house. The next meeting will be on Jan. 4, when it is understood that another engineering paper of more than ordinary interest will be read.

THE Bank traffic staff were unfortunate in the weather when their first whist drive of the season was held at "Ye Mecca" Cafe on Nov. 23. Notwithstanding the terrors of bespattered mud and pouring rain, 170 assembled at the tables. The prizes were all given by friends, and the committee had the satisfaction of handing over £4 to the Hospital Saturday Fund. Miss Reekie, the "Bank" Clerk-in-Charge, who takes a leading part in the organising of these functions, wishes to thank all those who helped to make the evening so successful.

WHEN Mr. Davis, Metropolitan Stores Manager, was appointed temporarily to Cardiff a few of his friends expressed a desire to present him with some small token of their esteem and regard. The outcome was the presentation by Mr. Clay, on behalf of the subscribers, of a handbag and travelling rug, the little ceremony taking place in the Superintendent's room on Dec. 5. The subscriptions were limited in amount and confined to some of the senior officers. Mr. Davis's popularity with his colleagues was evidenced by the willing response made when the project was first mooted.

Two debates figured on the programme of the Operators' Society on Dec. 12. The first subject was "Are Speed of Answer Tests Useful?" The affirmative was maintained by Miss Somers, Supervisor, Paddington, while Miss Berry, Senior Supervisor, London Wall, opened for the negative. Miss Berry, according to strict debating rules, rather gave her case away by admitting that the term "useful" confined the subject within such narrow limits that she would have to go outside its scope. She certainly gave a very able and loudly applauded exposition of the bad effects of speed-of-answer tests. The discussion was very good indeed, but the exponents of the affirmative received scant encouragement from the majority of the ladies present: in that respect, perhaps, the debate was a little one-sided, as it was so evident on which side the popular sympathies lay. One rather got the impression that a complete case had not been stated for either side, and it certainly does seem as if a great many operators still consider that tests are made as much for the purpose of "finding fault" as for sampling the service. The second subject bore the somewhat cryptic title "Should an Operator Answer One Call Immediately after Another?" If the question were put to a novice he would unhesitatingly and rashly answer "Certainly," particularly if he happened to be an impatient subscriber. However, it turned out that the question as put was not really the question at all, for it was found that Mr. A. E. Abbott—now of Birmingham—was showing

that the best method for an "A" operator was to get all her signals answered quickly, leaving the completion of the connections until that had been done. Mr. T. Beck, Exchange Manager, Bank, on the other hand, demonstrated ably that a call having been taken, the operator should complete it before answering another. It was a very pretty problem, and the interesting discussion showed that there are in the traffic ranks two divergent schools of thought. The Operators' Society is conferring a real boon on the staff by affording opportunities to discuss such matters. The attendance at the meetings continues to be very encouraging. The next meeting will be held on Jan. 11.

MR. H. CRISP, Clerk, Sales Department, City, was presented on Dec. 13 with a marble clock and ornaments on the occasion of his marriage. Mr. Crisp is well-known to the staff, and his many friends wish him a happy married life.

### GLASGOW NOTES.

OWING to the absence of Mr. J. R. Thyne on inventory duty the presidency of the National Telephone Society (Glasgow and West of Scotland districts) was rendered vacant. A special committee meeting was held on Nov. 25 when Mr. C. J. Millar was unanimously elected president in lieu of Mr. Thyne, and Mr. J. F. Scott, vice-president, in place of Mr. T. Pettigrew, who is also on inventory duty.

WE regret to record the death of Mr. Thomas Barton, formerly of the Clerical Department, who passed away on Friday, Nov. 18. Mr. Barton, who was about 78 years of age, was the "Father of the Glasgow clerical staff." He was formerly an employee of the Caledonia Telephone Company, and entered the service in March, 1892, when the Company acquired the former undertaking. Deceased retired some four years ago, and up to the last few weeks has enjoyed good health. Of a genial disposition, Mr. Barton was much respected by all who came in contact with him, and much sympathy is felt for his family in their bereavement.

THE third meeting of the Telephone Society was held in the new Lecture Hall of the Technical College on Dec. 14. Mr. C. J. Millar, president, occupied the chair, there being a good attendance of members. A paper was read by Mr. Allan, A.M.I.E.E., Electrician, on "Telegraphy." The development of the telegraph system in this country was traced and an account given of the successive steps which were taken to improve the apparatus and lines so as to meet the requirements of the increased traffic. Various types of apparatus such as single needle instruments, sounders, Wheatstone A.B.C. relays and keys, were shown, and the method of working was explained by means of diagrams of the circuits on which the various pieces of apparatus are used. A Wheatstone automatic set was shown working on an artificial circuit and proved of special interest to the members. The apparatus was run at various speeds and a demonstration was also given of the method adopted for perforating the strip to be run through the transmitter. A specially prepared strip of one page of Mr. Allan's paper was run through at a speed of 250 words per minute and the ribbon from the receiver shown to the members.

At the close of the lecture Mr. Allan was accorded a hearty vote of thanks for his interesting and able paper. Mr. Heatherington of the Post Office who assisted with the demonstration was also thanked.

The apparatus used for demonstration purposes was kindly lent by Major O'Meara.

**Hospital Fund.** The sum of £183 10s. has been contributed by the staff for year ending Nov. 24 in respect of this fund. It is gratifying to note that since the inception of the fund in 1903 the sum of £1,378 has been subscribed and divided over the various charitable institutions.

This year's contributions have been distributed as follows:—

	£	s.	d.
Royal Infirmary .. .. .	32	0	0
Western Infirmary .. .. .	32	0	0
Victoria Infirmary .. .. .	18	10	0
Convalescent Home, Lezlie .. .. .	4	10	0
" " Dunoon .. .. .	20	10	0
Samaritan Hospital .. .. .	2	5	0
Eye Infirmary .. .. .	4	10	0
St. Andrew's Ambulance Association .. .. .	4	10	0
Glasgow Maternity Hospital .. .. .	4	10	0
Consumptive Sanatorium, Bellefield .. .. .	2	5	0
Sick Children's Hospital .. .. .	4	10	0
Quarriers' Consumptive Home .. .. .	4	10	0
Cancer Hospital .. .. .	4	10	0
Ear Hospital .. .. .	4	10	0
Sick Nursing .. .. .	2	10	0
Quarriers' Home .. .. .	2	10	0
Kilmun Convalescent Home .. .. .	2	10	0
Eastpark Home for Infirm Children .. .. .	4	10	0
Broomhill and Lanfine Homes .. .. .	4	10	0
St. Elizabeth's Home .. .. .	2	10	0
Fresh Air Fortnight .. .. .	2	10	0
Benevolent Fund .. .. .	18	10	0

£183 10 0

ARRANGEMENTS are again being made for a visit to the Theatre Royal pantomime. It will be remembered that last year a similar event took place when the entire upper circle and pit were reserved for the Company's employees and friends. Although the actual evening has not yet been fixed it will probably be about the end of January. As last year the demand for seats was greater

than the supply early bookings are advised. Mr. J. W. Macdonald, Cashier, has kindly taken the arrangements in hand.

*The National Telephone Operators' Society and Club.*—The third meeting of the session in the form of a social evening was held on Monday, Dec. 12. There was a large attendance including several friends and guests.

Mr. Valentine, District Manager, was chairman for the evening, and among others present were Mrs. Valentine, Mr. and Mrs. C. J. Millar, Mr. and Mrs. J. M. Anderson, Mr. and Mrs. T. Rodger, and Mr. J. R. Brown. Mrs. Dunn (the first female telephone operator in Glasgow) was also present.

After tea a varied programme, including vocal and instrumental selections, readings, and dancing, was indulged in and was much enjoyed. The committee were rewarded by a most successful evening.

*Whist Club.*—This club, which proved so successful among the office and contract staffs last year, has resumed practice for the winter. Meetings are held every other Friday, and these are being fairly well attended and much enjoyed. Mr. A. C. Thomson is again an able and energetic secretary.

Owing to the calls of Inventory the following temporary changes in the office staff have been effected:—Mr. J. W. Macdonald to be Cashier; Mr. J. F. Scott, Cost Clerk; Mr. J. Gibson, Rental Registers Clerk; Mr. M. Cullen, Stores Clerk; Mr. G. Dewar, District Manager's Confidential Clerk; Mr. H. Murray, Petty Cashier; Mr. J. McGinlay, Correspondence Clerk; Mr. J. Paton, Rental Registers Department.

In the periodical absence of Mr. J. M. Anderson, the duties of Chief Clerk will devolve upon Mr. J. W. Macdonald, while Mr. J. F. Scott, will control the General Office.

*Staff Benevolent Fund.*—The amount of £22 19s. 6d. has been distributed for the year ending Nov. 24 in respect of the above fund, relief being granted to eleven necessitous cases.

*Clydebank Exchange.*—The members of the staff of Clydebank Exchange and friends held an "At Home" on Nov. 25, in the switchroom of the new premises, advantage being taken of this before the installing of the apparatus. About twenty couples were present among those being Mr. and Mrs. Rodger and Mrs. Peters. Dancing was engaged in and several songs were rendered by members of the staff. Altogether a most enjoyable evening was spent.

## NEWS OF THE STAFF.

Mr. C. C. WORTE, District Manager at Hull has been transferred to a similar capacity to Edinburgh. Mr. WORTE entered the service in November, 1885, and has been successively Local Manager at Cambridge (1893), Watford (December, 1893), Reading (1896) and District Manager at Canterbury (1897) and Hull (1900).

Mr. J. W. SWITHINBANK, District Manager, Middlesbrough, has been transferred to the District Managership of Hull. He entered the service in August, 1881, and was appointed Local Manager at Leeds in 1893, and District Manager at Middlesbrough in 1898. He was presented with a handsome travelling-bag on his leaving Middlesbrough for Hull. Mr. T. Hann, Chief Clerk, made the presentation and expressed the good wishes of the staff for future success and welfare. A presentation of a hand-bag was also made to Mrs. Swithinbank as a token of regard.

Mr. A. ROBERTS, Chief Electrician, Liverpool, has been appointed District Manager at Middlesbrough. He will for the present continue to perform the work he is engaged upon in connection with the taking of the inventory. Mr. ROBERTS entered the service in January, 1885, was appointed Chief Clerk, Liverpool, 1895, Local Manager, Bootle in 1902, and Electrician, Liverpool, in July, 1909.

Miss MARY ANDERSON, Travelling Supervisor for Ayrshire, was presented with a dressing case by the staff on her leaving to take the position of Senior Operator at Belfast.

Miss MARGARET LILIAN RIFTON, Leeds, who entered the Company's service in April, 1908, has resigned. She was presented with a jewelled pendant and chain by the members of the staff.

Miss HELEN HEPPWORTH, Leeds, who entered the Company's service December, 1906, has resigned. She was presented with a silver hand mirror by the members of the staff.

Mr. JAMES PARKER GARNER, A.M.S.T., Test Clerk, Manchester, was the recipient of a handsome leather suit case on the occasion of his leaving the service to take up a partnership with Messrs. Hy. Garner, Limited, Midland Motor Works, Birmingham. Mr. G. S. Wallace made the presentation on behalf of the Traffic and Electrical Departments.

Mr. F. C. FRENCH, Cost Clerk, Manchester, has been transferred to Headquarters Inventory staff, and Mr. J. C. MACDONALD, Chief of Rentals Department has been appointed Cost Clerk during Mr. French's absence. Mr. H. WOOD, Rental Clerk, being appointed Chief of Rentals Department *vice* Mr. Macdonald.

Mr. B. A. BELL, Acting Chief Inspector at Manchester, has been transferred to the Inventory staff.

Mr. F. A. ROMERIL, Clerk and Collector, Jersey, was presented on Nov. 26 with a handsome kit bag, the gift of the members of the Jersey staff, on his leaving the district to take up clerical duties in the Portsmouth district. Mr. Howard Eady, District Manager, made the presentation in the name of the staff, and wished Mr. Romeril every possible success in his new sphere of labour.

Mr. B. LISTER, Sub-Engineer, Leeds, has been transferred to a similar position in the Liverpool district. Before leaving he was presented by the Engineer on behalf of the staff with a case of toilet articles.

Mr. H. ARGYLE, Learner, has been transferred to Liverpool. He was presented with a case of razors before leaving.

Mr. H. CONSTANTINE, Engineer's Clerk, Leeds, has been transferred to Head Office Inventory staff. Before leaving he was presented by the Engineer on behalf of the staff with an umbrella and other useful articles as a token of their regard and best wishes. Mr. Constantine has been over twenty years at Leeds.

Mr. W. MYERS, Exchange Inspector, City Exchange, Manchester, has been transferred to Exeter on the Inventory staff. He was presented by the electrical staff at City Exchange with a pair of military hair brushes and by the supervising staff with a gold tie pin.

Mr. JOSEPH B. CRAIG, Exchange Manager in Training, Glasgow, has been appointed Exchange Manager, Royal Exchange, Glasgow.

Mr. GEORGE EDWARD, Exchange Manager, Royal Exchange, Glasgow, has been transferred in the same capacity to Hillhead Exchange.

Mr. C. N. CANTER, Exchange Manager, Hillhead Exchange, Glasgow, is being transferred to the Traffic Department temporarily.

Miss JEANIE GORDON, Operator, Tron Exchange, Glasgow, has been promoted to be Travelling Supervisor, Ayrshire district.

Miss ELIZABETH DEWAR, Operator, Royal Exchange, Glasgow, left on Nov. 24 to go abroad. The staff in her exchange presented her with a cabin trunk and writing case.

It will be interesting to the staff who are acquainted with his photographic work—from illustrations and lantern slides which have accompanied his papers on telephone matters in various parts of the country—to learn that Mr. F. H. LANGDON DAVIES, Acting Local Manager, Reading, has been elected to the Fellowship of the Royal Photographic Society.

Mr. J. MAGGS, Inspector-in-Charge, Ascot, was presented with a silver-mounted walking stick, suitably inscribed, and an illuminated address, by the operators and others connected with the Ascot staff on the occasion of his taking up his new duties on the Company's Inventory staff.

Miss MARY H. FALCONER, Operator, Leith, resigned on Nov. 30 last, owing to her people having removed to London.

## METROPOLITAN STAFF CHANGES.

Mr. S. G. OVERALL, Night Operator, Paddington, appointed Inspector, Paddington.

Mr. R. CHARGE, Divisional Construction Electrician's Clerk, West, to Inventory staff.

Mr. A. W. POOLE, Call Office Attendant, Westminster, to Divisional Construction Electrician's Clerk, Gerrard.

Mr. G. A. PAYTON, Divisional Construction Electrician, South-East, to Inventory staff.

Mr. A. J. BARRY, Clerk, Metropolitan Electrician's Office, to Inspector, London Wall.

Mr. W. V. PEDDEN, Inspector New Cross, to Fault Clerk, Battersea.

Mr. W. L. WOOD, Maintenance Clerk, Battersea, to Inspector, Hop.

Miss BEATRICE BRYANT, Operator, Woolwich, promoted to Supervisor-in-Charge, Erith.

Miss EDITH FULLER, Supervisor, Hop, transferred to Supervisor, Holborn.

On Mr. A. E. ABBOTT'S transfer from the position of Exchange Manager, North, to Central Birmingham, he was presented with a very handsome barometer by the combined traffic and maintenance staffs of the North district.

Mr. Abbott leaves London with the best wishes of his late colleagues and staff for continued success in his new position.

On Miss LOUISE REID'S transfer from Dalston to a similar position as Clerk at London Wall, she was presented by the staff, with whom she was very popular, with a silver watch.

## MARRIAGE.

Miss ANNIE HENDERSON, Operator, Shettleston Exchange, Glasgow, left on Dec. 1 to be married. She was presented with knives and forks by the staff in her exchange.

Miss REBECCA BERRY, Operator, Springburn Exchange, Glasgow, left on Dec. 15 to be married. She was presented with a dinner service by the staff in her exchange, and with a silver fruit stand by the members of the committee of the operators' society and club.

Mr. S. C. SMITH, District Manager, West Kent district, was presented with an electric radiator by the staff of the district on the occasion of his wedding.

Miss NELLIE CUNNINGHAM and Miss MABEL REYNOLDS, members of the operating staff, Middlesbrough Exchange, were presented with dinner services on the occasion of their resigning to be married.

## OBITUARY.

We regret to record the death by drowning of Mr. O. S. FLOWER, Service Inspector at Brighton. Mr. Flower had been suffering from nervous breakdown, and after leaving a sanatorium at which he had been resting, is supposed to have drowned himself, under the influence of temporary insanity. Mr. Flower was a most popular man at Brighton, and took the lead in all the arrangements for social functions, outings, etc., and his breakdown was a real calamity to the staff there.

We regret also to record the death of Mr. W. PRICE, Line Foreman, Swansea district, who passed away after a painful illness on Dec. 12. The deceased was an old telephone man, his service dating back to March, 1886, when he joined the Western Counties and South Wales Telephone Company at Newport. A wreath was subscribed for by the members of the Swansea staff, and his colleagues on the line staff carried him to his last resting place.

## LOCAL TELEPHONE SOCIETIES.

**Bath.**—On Dec. 14, at the third meeting, which in view of the inclement weather was well attended, papers were contributed by the following members of the Bath centre operating staff:—Misses M. H. Fryer, I. A. Garlick, D. M. Hall, R. Marchmont and D. A. Owen. A number of useful suggestions were made and an animated discussion ensued.

**Birmingham.**—The third meeting of the session was held on Dec. 2, at the Mecca Café. "Does it Pay to Specialise" was the topic for debate, which was opened in the affirmative by Mr. M. Bowes and Mr. T. Rooke in the negative. A very good discussion followed, in which everyone took part.

**Birmingham Operators.**—The third meeting of the session was held on Dec. 8 in the Midland operators' dining room. The meeting took the form of a magazine night, members contributing papers under a *nom de plume*, for which the committee offer three prizes. There were ten papers sent in on the following subjects:—"Hints on 'B' Operators," "Operating Call Offices," "Operating District Calls," "Keyless Ringing," "Two-Lamp Clear," "C.B. Testing (Midland)," "C.B. Testing (Central)," "Subscribers and Their Sorrows," "An Operator's Suggestion," "Telephone Progress." Miss L. Cragg and Miss A. Gye consented to read the papers, which were voted for by the members, and the result will be published later. Mr. L. Creecraft was in the chair.

**Bolton.**—Three meetings have now been held: the first and general meeting on Oct. 27, for the election of officers, arrangement of syllabus, etc. Mr. King, Contract Officer, Rochdale, gave an interesting and breezy account of the production of the *Daily Mail*, entitled "From Forest to Breakfast Table," illustrated by slides kindly lent by the *Daily Mail*.

On Nov. 24 Mr. Magnall, Engineer, Manchester, gave a paper on "Recent Line Faults, Overhead and Underground." The paper was of great practical value and, illustrated by a number of slides, various points were discussed.

Mr. Leeming, Local Manager, Bury, gave a paper on Dec. 15 on "Electric Light and Power Distribution." The subject was dealt with in an able manner, and ranged from steam plant to electric plant and mains. A series of slides were shown, and an interesting discussion followed.

**Bradford.**—The opening meeting of the telephone society took the form of a smoking concert, held at the "Rawson Hotel," on Oct. 21. The president of the society, Mr. H. B. Sutcliffe, took the chair, and in a few well-chosen words welcomed those present, especially mentioning members of the Inventory staff who are at present in Bradford district. A varied and interesting programme was subscribed by several members of the staff, and altogether a very pleasant evening was spent.

On Nov. 16 Mr. B. S. Cohen, of Head Office, gave a paper on "Telephone Investigation Work." The chair was occupied by the hon. president Mr. J. C. Chambers, who, prior to introducing the lecturer, presented to Mr. Bryant, of Salisbury House (who is at present in Bradford as a member of the Inventory staff), the second prize awarded by the education committee for the best paper in Class 3 of last session's competition. Mr. Cohen then proceeded with his paper which dealt thoroughly with the investigation work in transmission as carried out at Head Office.

A non-technical paper was given before a small but appreciative audience on Dec. 14, Mr. K. Baldwin of the district office staff was the lecturer and took as his subject: "The British Empire." He endeavoured to prove by means of both prophecy and history, that the British race is identical with the lost ten tribes of Israel.

A lecture on "Traffic" was given to the Bradford operating staff by Mr. A. L. May, Traffic Manager, on Nov. 10. There was a good attendance of about 50 members. The following subjects were treated in a lucid manner:—"Manning of Traffic and the Work of a Traffic Department," "Advantages Derived from the Study of Traffic," "The Observation Table," "General Operating Methods and Expressions." Enthusiasm was shown by the manner in which the discussion was taken up by the monitors and supervisors. The lecture has been repeated at Halifax, Huddersfield and Keighley.

**Bristol.**—The second annual dinner of the Bristol district staff took place at Stuckey's Restaurant on Nov. 12, when a company of about 100 sat down to dinner. The members of the Inventory staff now in the Bristol district were fully represented. Mr. R. A. Dalzell, Provincial Superintendent, presided, and he was supported in the vice-chair by Mr. A. Perkins, District Manager. After dinner a smoking concert was held, which proved to be a most successful one. The talent at the command of the chairman (composed of practically entirely of members of the staff) was exceedingly good, and a most enjoyable evening was spent. The usual toasts and votes of thanks were proposed. The following artistes deserve special commendation:—Messrs. J. E. Jones, F. Taylor, W. C. Owen, J. T. Smith, J. Wilkins, A. McNab, A. Mass, L. Saunders, P. Shipp and Miss Dora Bubbear. Mr. W. Romain (Inventory staff) proved an accomplished pianist.

A successful whist drive was held at Lloyd's Cadena Café on Oct. 29, when a party of 128 spent a most enjoyably evening. Practically all members of the Inventory staff who are at present in Bristol were in attendance, and three out of the six prizes awarded went to them. The committee—consisting of the Misses Hagley, Lee, Knowlden, Jarrett, Fox, Rice, Jones and Cann—are to be heartily congratulated upon this their initial attempt, in so far as the staff is concerned, at a gathering of this sort, and at the vote of thanks proposed to them at the close of the meeting the hope was expressed that they would undertake to organise future gatherings of this description. Mr. Perkins, the District Manager, presented the prizes and Mr. Lamb officiated as M.C.

The third meeting was held on Dec. 15, when two papers were read, one by Miss Hagley on "A Month's Routine in the Post Office and Junction Fees Department," and the other by Mr. L. Saunders, entitled, "Humours and Pathos of Wayleaving," both of which were very interesting, that of Mr. Saunders affording considerable amusement, as was to be expected from the title. The information given by Miss Hagley was much appreciated by

all of the members present, especially to those of the Contract Department, who obtained information which will be very useful to them in their canvassing.

**Bristol Operators.**—The third sessional meeting was held on Dec. 15 when five papers were given by members of the Bath centre operating staff. These papers showed a very high standard of intelligence and contained useful suggestions with regard to expressions, service difficulties and so on. Mr. A. Perkins (District Manager) presided, and there was an attendance of 60 equalling 90 per cent.

**Brighton.**—On Nov. 28 Mr. W. Jenkins gave a very illuminating lecture on "Routine Testing," illustrated by many charcoal diagrams, lantern slides and blackboard drawings. The whole was very cleverly prepared and proved most interesting. Mr. F. J. Frost was in the chair.

**Cardiff.**—The second meeting of the session was held in St. John's School-rooms on Nov. 10. Mr. S. F. Whetton was in the chair and there was a good attendance. A paper was read by Mr. W. E. Gauntlett, Swansea, entitled "The Present Position." The paper, which was an interesting one, dealt very lucidly with the organisation and work of the Inventory staff, and was followed by a short discussion.

**Coventry.**—At a meeting held at the County Restaurant on Dec. 12, with Mr. F. Alcock in the chair, Mr. L. Meek read a paper on "Electrical Measurements," describing various methods and pieces of apparatus for the measurement of resistances and the location of faults. After a short interval, Mr. F. B. Farrand gave his paper on "The Public & The Telephone," in which he dealt with the obstacles that the contract officer had to overcome when in search of new business: phrases, the way they catch the eye and their value. "London to Birmingham in two hours," says the railway company. "London to Birmingham and back in ten minutes," says the telephone. "The Burglar's Waterloo—The Telephone," &c. Each paper was followed by a good discussion.

**Cnelttenham.**—On Nov. 17 a whist drive and social was held to celebrate the opening of the session 1910-11. A very enjoyable evening was passed, about 45 of the members and friends being present.

On Nov. 24 the first meeting of the session was held, when Mr. R. T. McCahay, Chief Inspector, gave an interesting paper on "Transmission." Illustrations in the form of drawings, lantern slides, and experiments greatly added to a very profitable evening.

The second meeting of the session 1910-11 was held on Dec. 8, when Mr. C. Elliott, of Gloucester (District Manager), read a most interesting paper on "Expenditure and Allocation." The whole of the members were present.

**Cornwall.**—The first meeting was held at Truro on Nov. 16, the vice-president (Mr. R. Harris) being in the chair. The minutes were read and confirmed, and a paper was then read by Mr. E. S. Byng, entitled "Economics," which was greatly appreciated by all present.

**Cork.**—The third meeting of the session was held on Dec. 8, when Mr. Houghton read a paper entitled "Magnetism." The subject was dealt with in an able manner. At the finish Mr. Roy passed a few remarks on various points mentioned.

**Coventry.**—The second meeting of the session took place at the County Restaurant on Nov. 24, Mr. R. S. Grosvenor presiding over a good attendance. An excellent paper on "Transmission" was read by Mr. H. P. Lloyd, Engineer, Birmingham, who is to be congratulated on the able way in which he dealt with a very difficult subject. A new feature of the meeting was an interval, during which light refreshments were served, and this interval was taken advantage of by the members of the society for the free discussion of telephone matters generally. It is thought that the good effects growing out of this experiment, which it is proposed to continue, will more than compensate for the expense.

**Dover.** In connection with the Dover Telephone Society, a branch meeting was held at Margate on Dec. 7, when Mr. E. J. Woods, Local Manager, Margate, repeated for the benefit of the Thanet centres—viz., Margate and Ramsgate—his paper on "Overhead Faults—How Preventable," which he had already given at Dover. Mr. C. F. Ashby, District Manager, occupied the chair. The paper was greatly appreciated and an interesting discussion followed. There was a good attendance.

The third meeting for this session was held on Dec. 13. Mr. P. C. Langridge (Chief Inspector, Dover) occupied the chair. Two papers were read as follows:—"Notes on Contract Department Work," by Mr. G. T. Baker, Contract Officer, Folkestone; "The Duties of a Wayleave Officer," by Mr. H. S. Gunn, Wayleave Officer, Folkestone. Both were sound, practical papers, and were keenly followed and afterwards discussed by those present.

**Dublin.**—The opening meeting of the 1910-11 session took place on Nov. 14, when a paper on "The Training of an Operator" was read by the Traffic Manager, Mr. R. Morgan. The subject was exhaustively and interestingly dealt with, and some very instructive questions were asked and answered. The paper was supplemented by an excellent address from the chair, which was occupied by the Superintendent for Ireland, Mr. F. Cowley. The value of telephone societies was enlarged upon, and the members of the staff were urged to take advantage of the facilities offered. A short further address by the District Manager, Mr. P. F. Currall, closed an interesting meeting.

On Dec. 5 the second meeting was held, a paper on "Raw Materials" being read by Mr. W. B. Haynes. In the unavoidable absence of the president, Mr. P. F. Currall, the chair was occupied by the vice-president, Mr. M. E. Connor. An interesting discussion took place at the conclusion of the paper.

**Dundee.**—The second meeting of the session was held on Nov. 24. In the unavoidable absence of the District Manager, the chair was taken by Mr. M. McEwan. Mr. D. T. Gordon gave a most interesting paper on "Cables," dealing with the processes of manufacture of lead-covered cables, and giving details of the methods of laying and jointing underground. The paper was illustrated by lantern slides, and was followed by a discussion which was taken part in by Messrs. Mackenzie, Riley, Carse, J. McEwan and M. McEwan.

**Edinburgh.**—The first whist drive of the season was held in Telephone House on the evening of Nov. 4, and was attended by a large and representative



gathering, including Mr. Gilmour, District Manager, and Mrs. Gilmour. After a close finish the prizes, a gold pin and a silver fruit knife, were presented by Mrs. Gilmour to the winners, Miss A. L. Taylor (Supervisor) and Mr. J. B. Conacher (district office). Mr. W. F. Fraser won the booby prize.

**Ampere Golf Club.**—The annual supper and presentation of prizes was held on Oct. 21 in Bisset's Rooms, Haymarket. Mr. R. Gilmour, hon. president, presided over a large gathering, and during the evening several members of the Company provided a most enjoyable programme of music. A telegram, to which a suitable reply was sent, was received from the Edinburgh staff engaged on inventory work in Bristol, for whom hearty cheers were given.

The telephone society held its second meeting on Dec. 5. Lectures were given by the following members:—Mr. D. McIntosh, Engineer, "Routing of Local and Trunk Junctions"; Mr. J. Mathieson, Traffic Department, "Elements of Traffic"; Mr. J. Gilbert, Electrical Department, "Electricity as a Factor in the World's Progress." All the lectures were illustrated with lantern slides. There was a good attendance.

**Gloucester.**—The second meeting of the session took place on Dec. 14. Mr. C. Elliott, District Manager, occupying the chair. A very instructive paper, illustrated by several diagrams, was given by Mr. A. E. Coombs, Traffic Manager, Bristol, entitled "Telephone Traffic and its Study." Interesting discussion followed, and several questions were asked, to which Mr. Coombs replied in an excellent manner.

**Greenock.**—The session opened on Nov. 17 with a splendid attendance under the chairmanship of Mr. J. A. Swanson. Mr. A. Ramsay Lamb gave a very instructive paper on "Staff Prospects." A discussion followed.

The second meeting of the session took place on Dec. 8, when Mr. J. V. Elliott read a paper on "Wayleave Records and Route Diagrams," illustrated by various diagrams. The paper was greatly appreciated. Mr. A. Ramsay Lamb occupied the chair.

**Isle of Man.**—The fifth meeting was held on Nov. 25, Mr. W. Kelly, Chief Clerk, occupied the chair, and explained that the District Manager having contracted a severe cold, was unable to give his paper. A paper was read by Lineman Inspector T. Lucas on "Switchboard Connections." The paper was most interesting, and showed that great care had been taken in the preparation of the subject, and that he had a good grasp of his work.

The sixth meeting was held on Dec. 9, Mr. W. Kelly, Chief Clerk, occupying the chair. A paper was read by Mr. G. Gilmour, District Manager, on "Main Principles of Dynamos, Motors and Magnets." By means of blackboard diagrams and electrical apparatus the main principles of the various apparatus set out in the paper were made very clear to all the staff.

**Leicester.**—At the second meeting of the society, held on Nov. 11, at the Foresters Institute, Mr. C. H. Lucas (Collector) read a short paper on "Automatic Boxes," describing in general terms the boxes in use and the faults which are common to them. Arising out of the various points mentioned by the lecturer, some useful discussion evolved. Mr. P. V. Sansome, secretary of the society, occupied the remaining portion of the evening with a paper called "Transmission and its Relation to Traffic." Sending and receiving allowances of various portions of the apparatus were briefly outlined, and the method of conducting a transmission test was shown, the curves and diagrams introduced by Mr. Sansome being much appreciated. Mr. F. Lucas, president, was in the chair, and at the conclusion of the lectures and discussions, Mr. J. Ashton, District Manager, made a short statement regarding the policy of the joint board recently formed.

**Leeds.**—Some 80 members and visitors gathered together on Dec. 14 to listen to Mr. G. F. Staite, of Manchester, who delivered an able and much appreciated lecture on "Traffic," illustrated with lantern views.

**Liverpool and Birkenhead.**—The second meeting was held on Nov. 17, Mr. E. S. Francis, Traffic Manager, presiding. A paper on "Telegraph and Telephone Work by the Territorial Forces" was read by Mr. S. J. Lown (Exchange Inspector). The paper dealt with the application of telegraphy and telephony in the British army generally, and particularly with the arrangements at the recent Hornby Camp. An interesting discussion followed, which further emphasised the appreciation of the paper.

**Luton.**—Mr. Henry G. Smith, Inspector-in-Charge, St. Albans, on Nov. 21 read a paper entitled "Overhead Work." That the subject was an interesting one was evinced by the fact that the subsequent discussion on points mentioned in the paper extended well into three hours. Mr. Smith interposed his remarks with a number of clear and well-drawn illustrations. In accordance with custom the paper was repeated at Watford a few days later.

**Manchester.**—The third paper of the session was read by the Engineer, Mr. A. Magnall, on Nov. 25, the subject being "Recent Line Troubles." Mr. Magnall dealt very minutely with D.C.-L.C. aerial cables, and afterwards with lightning troubles on L.C. A. cables. The paper was a most enjoyable and instructive one, and was followed by an interesting discussion, in which the following took part:—Messrs. Weatherby (H.O.), Caldecott, Smith, Godfrey and Wallace.

**Middlesbrough.**—On Oct. 15 a party of Middlesbrough staff and friends visited Newcastle, and engaged in a friendly game of football with the Newcastle staff. After a very evenly contested game the Middlesbrough team retired victors by two goals to one. Out of five matches played with the Newcastle team this is the first win Middlesbrough have recorded. After the contest the Newcastle friends entertained the visitors at the Vegetarian Café. Hearty votes of thanks and expressions of good fellowship concluded a very pleasant outing.

**Newcastle.**—The second meeting was held on Nov. 14, in the engineer's room, when there was a good attendance, Mr. J. P. Urwin occupying the chair. An excellent paper on the subject of "Works Orders" was submitted by Messrs

T. Hall and F. Vernon. A second paper on "Instrument and Exchange Faults" was also submitted at short notice by Mr. H. A. Sadler, the subject being handled in a practical manner and the diagrams fully explained. The papers were much appreciated and were freely discussed by Messrs. A. Drummond, E. T. Payne, J. P. Urwin and other members of the staff present.

**Nottingham Factory.**—A tug-of-war on roller skates took place on Oct. 26 at the Princess Skating Rink, Nottingham, between members of the Factory staff and the Rink staff, resulting in an easy win for our "boys" by three pulls to one.

On Nov. 19, Mr. G. Goodhand gave a very interesting paper on "Electrical Signalling on Railways," in the course of which attention was called to the important part played by electrical apparatus in the working of railways. By means of lantern illustrations and by experiment, the various apparatus used were described in detail, together with their methods of operation.

The third meeting of the session was held on Dec. 16, when Mr. J. W. Faulkner gave a paper on "Early Telephones," illustrated by lantern slides. After reviewing the early history of telephones, slides were shown of obsolete instruments which had come under the author's notice during the process of repair, each slide being briefly explained.

**Paisley.**—The first meeting was held on Nov. 23; Mr. Wm. Leithead, president, being in the chair. Mr. A. Ramsay Lamb gave a very interesting address entitled "Staff Prospects," and the lecture was enjoyed by everyone present. Everything points to the society having a successful session.

**Sheffield Operators.**—The third meeting was held on Dec. 15, and took the form of a competition night. For this purpose the operators were divided into "Senior" and "Junior" divisions, the senior division consisting of operators who have had four years service and over. Six papers were read by the following operators in the "Senior" division:—Misses N. Betts, E. M. Bradshaw, E. A. Close, V. Hebden, C. Hemmingway and N. Raynor. The first or president's prize, a lady's hand-bag, was awarded to Miss N. Betts, the second, or committee's prize, *Tielma* (by Marie Corelli), being won by Miss E. M. Bradshaw. There was a good attendance of traffic staff, including the Exchange Manager, all of whom thoroughly enjoyed the papers. The chair was taken by the Traffic Manager (president), who also presented the prizes.

**Southern (London).**—The monthly meeting of this society took place on Dec. 14, when two interesting papers were read on "The Slide Rule," and "Our Ideals," by Messrs. T. M. Inman and H. G. Corner respectively. The attendance was disappointing, doubtless due to unfavourable weather. An invitation was issued to the traffic staff of the district.

**Sunderland and Shields.**—The second meeting was held on Nov. 23 at Sunderland, Mr. W. J. Douglass presiding. The minutes of the previous meeting were read and confirmed. It was agreed that the next meeting be held on Dec. 14. The rest of the evening was devoted to a visitation of the Sunderland C.B. system, and matters of interest were discussed.

Another meeting was held on Dec. 14. A paper on "General Stores" was given by Mr. J. Gilroy, on which discussion followed and points were raised regarding inventory matters. Another paper was given by Mr. W. H. Abbott on "Expenditure." The next meeting will be held on Jan. 25, Mr. M. Byrne will give a paper on "Wireless Telephony."

**Swansea Operators.**—The third sessional meeting was held on Dec. 14, when a general debate on traffic matters constituted the principal portion of the evening's programme. Mr. W. J. Hodgetts, Engineer, occupied the chair. A number of points relative to operating were raised by various members and an excellent discussion was participated in by practically all who were present. Useful information was brought to light and considerable powers of argument on the part of the speakers were indicated, the general interest being shown by the keenness with which the debate was followed. Mr. W. H. Crook, Chief Clerk, afterwards gave an excellent short lecture "On a Tour through the Midlands," which was illustrated by some excellent lantern views of English Midland scenery including the Peak district, the slides being kindly lent by the Midland Railway Company.

**Torquay.**—The second meeting was held on Oct. 24, when Mr. D. J. Mickleham, Contract Manager, read a paper entitled "Some Phases of Contract Work." He illustrated with diagrams the growth of subscribers' service with the introduction of private branch exchange system. An interesting discussion ensued.

The third meeting was held Nov. 14, when Mr. W. H. Robnett, Chief Inspector, read a paper entitled "Instrument Faults: Cause and Remedy." The paper was very interesting. Numerous parts of instruments were shown and a good discussion followed.

The fourth meeting was held on Dec. 5, when a paper was read by Mr. G. F. Brough entitled "Improvements in Construction." The essayist described the improvements in certain portions of construction work brought about by the improved material used, samples of which were shown. The question of damage to poles by climbing was raised and a good discussion followed.

**Tunbridge Wells.**—The second meeting of the session was held at Ralph's Restaurant on Dec. 5, when Mr. P. W. Whibley read a paper, which was illustrated with drawings, on the "Tunbridge Wells System." The lecturer dealt at some length with the peculiarities of the Tunbridge Wells system, and gave full and lucid explanations of the whole working. A brief discussion followed.

**Western Metropolitan.**—The second meeting of the session was held at Gerrard Exchange on Dec. 6, on which occasion Mr. J. H. Pattman (Electrophone Manager) read a paper entitled "The Electrophone of To-day." Lantern slide illustrations were shown and various electrophone apparatus was also on view. Following the reading of a very interesting and instructive paper, the company

adjourned to the electrophone reception room and took part in a trial hearing of the service.

**Wolverhampton.**—The second meeting was held on Dec. 2, Mr. Terras, of the Inventory staff, being in the chair. Mr. C. W. Piggott, Traffic Manager, Birmingham, read a paper entitled "Past and Present," which gave an interesting account of the evolution of operating methods during the last 25 years. The paper was illustrated by a series of good lantern slides. In the discussion which followed the question of the precise definition of a "team" was debated. Notwithstanding very bad weather, there was a good attendance of members, the operating staff especially being well in evidence.

### STAFF GATHERINGS AND SPORTS.

**Bradford.**—On Nov. 30, under the auspices of the telephone society, a very successful whist drive, social evening and dance was held. Whist occupied the earlier part of the evening, and after supper dancing was indulged in until the early hours of morning. A very good concert was provided by members of the staff in a separate room, for the benefit of those who did not care to dance. In addition to the local staff there was present a large number of the Inventory staff, who also contributed largely to the concert programme, the humorous songs provided by Messrs. Scott and Kenworthy being a special feature of the evening.

**Brighton.**—The second whist drive of the season was held on Dec. 14, when 48 were present at Smith's "Bon-Bon Shop," Preston Street. The result of the play was as follows:—Ladies: First prize (biscuit box), Mrs. Prudden; second prize (rose bowl), Miss Huxtable. Gentlemen: First prize (leather wallet), Mr. Ockenden; second prize (metal cigarette case), Mr. W. Davis. Consolation prizes, Miss Rose and Mr. O. J. Archer. At the end of the drive dancing was indulged in and continued till 1 a.m. M.C.: Mr. E. J. Clarke, assisted by the Misses Trott, Webb and Agutter and Messrs. H. Drury, O. J. Archer and W. Jenkins.

**Cardiff.**—The annual whist drive and dance was held at the Whitehall Rooms, Park Hotel, on Dec. 18 from 8 p.m. until 2 a.m., when about 180 of the staff and their friends spent a most enjoyable evening. Dancing and whist were indulged in, and the two first staff prizes were won by Miss Coates and Mr. Thorn. First lady's prize, Miss Spearing; second lady's prize, Miss Lates. First gentleman's prize, Mr. Harbidge; second gentleman's prize, Mr. G. D. Bateman. Mrs. Waite very kindly presented the prizes. The M.C.'s for dancing were the Misses Williams, Osborne and Hockey, and Messrs. Whetton and Riley. For the whist, the M.C.'s were Messrs. Marsh and Ryland.

**Edinburgh.**—The annual general meeting of the Edinburgh Telephone Thrift Club was held on Dec. 12, Mr. R. C. Wilson, vice-president, being in the chair. That the past year has been a most successful one was shown by the following:—Membership, 186; balance in bank, £127; amount of deposits during the year, £544. In place of Mr. A. McNab, now on Head Office Inventory staff, Mr. W. Wilson was appointed secretary.

The Edinburgh staff football club—National Amateurs—held a smoking concert in the "Imperial Hotel," Market Street, on Dec. 9. Mr. Robertson, Electrician, presided over a large gathering of the staff and their friends. An excellent programme of vocal and instrumental music was provided by the members of the Company.

**Leicester.**—Those members of the Leicester Telephone Society who took advantage of the opportunity afforded them to visit Nottingham, desire to place it on record, how very much the visit, in all its phases, was enjoyed. It was unfortunate that circumstances would not allow more than 22 of the members to accept the kind invitation of the combined Nottingham societies. The Leicester contingent were met at Nottingham Station on Nov. 19 by the secretary of the Nottingham Factory Society (Mr. Bowman) and proceeded under his direction by train to Station Street, where Mr. Fenton, the Factory Manager, personally welcomed each member of the party. Each department was inspected and a representative from each department was at hand to facilitate the efforts of Mr. Fenton to make the demonstration as complete as possible. Messrs. Macadie, Briggs and Baxter were untiring in their explanations, which were in great requisition, while Mr. Bone's practical experiments were much appreciated. After the visit to the Factory, the combined members of the District and Factory Telephone Societies entertained the party to tea. Calvert's was the rendezvous and the repast most excellent. In responding to the thanks of Leicester Society, expressed by the president (Mr. F. Lucas) on their behalf, Mr. Sibley, the District Manager, heartily welcomed the Leicester staff to Nottingham. Afterwards a visit was made to the exchange where Mr. Sibley was ably supported by the heads of departments, who all combined to make the visit of interest. Under the guidance of Mr. Morris, the Electrician, an inspection was provided of all the interesting details a C.B. exchange affords, not forgetting the rock cellar, after which the party scattered for a time, some to renew old friendships, others possibly to make new.

**Manchester.**—The December meeting of the C.D. (Manchester) club was held on the 12th, when a most interesting lantern lecture was given by Mr. Hayward on "Amongst the Lakes and Fells of Cumberland with a Camera." There was a capital attendance of members and friends who thoroughly enjoyed the many excellent scenes thrown on the screen.

The proceedings afterwards terminated with the usual musical and elocutionary programme.

**Portsmouth.**—On Nov. 26 last, the operating staff held their whist drive at the Cadena Café, Southsea. Twenty-seven tables were occupied, Mr. S. J. Smith, District Manager, being present, and amongst the guests were the Corporation Tramway Manager, Mr. W. R. Spaven, Councillor Timpson and Mr. W. S. Foale, Chief Electrician of Portsmouth Corporation Electric Light

Works. A very enjoyable evening was spent and the prizes were distributed by Mrs. S. J. Smith.

**Wolverhampton.**—A successful dinner was held by the North Midland district staff at the "Victoria Hotel" on Dec. 1. A large number of guests and visitors from the Inventory Departments, National and Post Office, at present in the district, also took part. The chair was taken by Mr. Archer Smith, the District Manager, who in the course of his remarks in proposing "Our Guests and Visitors," referred to the cordial and amicable working that had characterised the relations between the Company's district and Inventory staffs, and the pleasure it had been to welcome them to the Company's building in North Street. He also paid a tribute to the unvarying courtesy, during the inventory, extended by the Department's officers. This was warmly responded to by Mr. Richard Johnson on behalf of the Post Office, and by Mr. J. Sinclair Terras on behalf of the Company's Inventory staffs. Other toasts were proposed by Messrs G. Richardson, E. J. Jarrett, and W. W. Gould, and included "The National Telephone Company," "The British Post Office," and "The Chairman," and responded to by Messrs. C. H. Redhead and — Hook, jun. Musical contributors to the success of a most enjoyable evening were Messrs. F. W. A. Clutterbuck, E. B. Cooper, W. W. Gould, R. W. Lloyd, T. Pettigrew, W. Roth, B. C. Saxton, G. Taylor and J. Sinclair Terras. The arrangements, admirably carried out, were in the hands of Mr. P. W. Lloyd.

### A VETERAN OPERATOR.

We have pleasure in publishing the portrait of Mrs. Brown who entered the Company's service as operator and caretaker at Barrhead in the West of Scotland district when the telephone system was introduced there in 1887, so that she has over 23 years of a telephone career to look back upon. In 1887 there were only twelve subscribers in Barrhead, whose connections were worked by means of the old-fashioned slipper-jack switch-board. This board served for a short time only, however, and was replaced by a more up-to-date one which served until 1905, when the system was metallic circuit and the outside wires placed underground.



MRS. BROWN.

The whole responsibility of the operating duties rested upon Mrs. Brown's shoulders until last year when, owing to the greatly increased traffic, it was decided to appoint a day operator, Mrs. Brown continuing to act as caretaker and night operator.

The subject of our sketch has served under seven district managers and ten local managers. Mrs. Brown knows and is known to every subscriber in Barrhead personally, and she has by her unfailing courtesy and attention gained the respect of each of them.

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## TELEPHONE MEN.

### LVII.—JAMES SINCLAIR TERRAS.

JAMES SINCLAIR TERRAS was born in Glasgow in 1873, and educated at the Albany Academy in that city. He entered the Company's service as a Junior Clerk in 1889, being engaged by Mr. F. Douglas Watson, then assistant district secretary; and was afterwards made Engineer's Clerk under Mr. William Aitken. Subsequently he was transferred to the Instrument Department, and after spending some time there was promoted to be Local Manager at Paisley in 1892 under the district managership of the late Mr. J. W. F. Ashwin. At that time the Renfrew Exchange was fitted with a Williams' switchboard, which remained in use until about 1899—a late survival of an early type. In the beginning of 1892 Mr. Terras received further promotion, being appointed District Manager at Galashiels, under the supervision (until the reorganisation in May, 1893) of Mr. C. G. Wright, who was then district manager at Edinburgh. Although the period of association was short, Mr. Terras looks back upon it with pleasant recollections, and feels that he gained much valuable knowledge under Mr. Wright from the latter's long experience in telephone work. The staff at Galashiels was a small one in those days, and the district manager was his own engineer and bookkeeper.

In 1896, when Mr. Terras was appointed to the position of District Manager at Greenock, a canopy switchboard on the call-wire system had just been brought into use in the exchange in that town, and soon afterwards the laying of an underground system to replace the overhead earth circuits was begun. During the same period the exchange systems at Port Glasgow, Rothesay and other places were converted to metallic circuit working. An effort to

open an exchange in the remote Argyllshire town of Campbelltown, a few weeks before the passing of the Post Office Bill in 1899, was unsuccessful. In the latter year a new switch-

board was installed in Paisley, and five years later, after protracted negotiations with the town council, the Company commenced laying an underground system there. All these activities combined to make Mr. Terras's term of office an eventful one. The year 1904 brought another promotion for Mr. Terras, for in July he was transferred to the District Managership of Reading. About that time a period of rapid development was beginning in different parts of the country, and eleven new exchanges were opened in the Thames Valley district during the first few years of his management. There was a spirited competition with a rival Post Office exchange in Newbury during the latter part of 1904, when the Company managed to secure a commanding lead which has since been maintained. In 1909 he was appointed Engineer to the important district of Birmingham, but after about a year's work in that position his services were required for the newly-formed Inventory Staff on which he was appointed a Divisional Officer. His principal indoor recreations are music and reading, whilst out of doors his pleasure is in walking and rowing. Mr. Terras is a good example of the shrewd Scotsman, and exhibits at the same time no inconsiderable measure of geniality and *bonhomie*. He

is a hard worker, and his record of progress in the Company's service shows conclusively how his work has been appreciated by those over him.





## GENERAL SUPERVISION.\*

BY FLORENCE MAY THOMAS, *Travelling Supervisor, Gloucester.*

It was with a good deal of diffidence that I accepted an invitation to read a paper on "General Supervision," because I have long recognised that the operators in this district are among the most efficient. Consequently I have determined to deal with the question more from the general standpoint than any other. Although of comparatively recent date the telephone system has been proved to be of such incalculable value as a means of communication that there are very few business houses of any standing that have not adopted it, and in fact commercial men cannot now afford to do without it. The telephone has not only come to stay, but it is going to become an even more important feature of our everyday life in the near future. As an illustration of what an essential factor the telephone is in the conducting of business, even in our smaller towns, I may mention that two of the largest firms in the Stroud district, Messrs. Apperly, Curtis & Company, Limited, of Dudbridge, and Messrs. R. A. Lister & Company, Limited, of Dursley, have adopted the private branch exchange system at their works. These exchanges have been installed with every regard to efficient working, and no expense has been spared in equipping them with the most up-to-date apparatus, and incidentally I might add that, in my opinion, this system of private branch exchanges is capable of very considerable extension, and I have no doubt that we shall see it greatly extended before the transfer.

To an outsider the inner working of the telephone is wrapped in mystery. Only we who are actively engaged in the work can fully appreciate the intricacies of it. On the occasion of my visit to Bristol, for training as travelling supervisor, I was very much impressed with what the operating staff termed their "visiting day." I learned on making enquiry that invitations are sent out to selected subscribers, so that in the course of time each one is afforded an opportunity of visiting the switchroom. The subscribers are thus given some idea of the difficulties of the work, with the result that where formerly they may have shown some slight irritation, now some consideration is given if from uncontrollable circumstances, they are not answered as promptly as they would like to be. That it is marvellous none will gainsay, and although it is true that "familiarity breeds contempt," I think operators and electricians who are interested in their work never tire of their duty, and are ever ready to devise and carry out anything which will be likely to tend to any improvement in a service which is almost as perfect as anything can possibly be. I do not propose to give any elaborate description of the system by which we work; that is unnecessary, because, of course, you are all so fully acquainted with it. At the same time, I think it is always useful, no matter how old in experience we may be, to halt sometimes and discuss with each other anything which concerns our work. Of all the different departments that go to make up the service I do not think there will be many who will disagree with me when I say that the duties of the operator from many points of view are the most important, and at the same time most exacting. Anything that tends to lighten their work and at the same time improve it is worthy of every consideration.

The switchboard has in recent years undergone many changes, and those now in use are undoubtedly a vast improvement of those formerly in use at some of the older exchanges in the district. The present boards are so designed as to assist the intelligent operator in every way, and there can be no genuine excuse for inefficient service. Everything that electricians and engineers have been able to devise has been incorporated with the object of enabling operators to give prompt attention to the calls of subscribers. In all cases the staff is sufficiently large to deal with the traffic; at least records are taken to ensure this being so, and therefore any complaint as to erratic service can be only attributed to the indifference of the operator. In these days speed in answering is not only desirable, but absolutely essential, and an effort should be made to give uniform service. It is unsatisfactory to answer one call in two or three

seconds, and to allow in other cases twenty or thirty seconds to elapse before replying to a subscriber's ring. The aim of the operator should be to give an even service at all costs, and with up-to-date equipment this is beyond doubt possible, granting always that the operator has her mind concentrated on her work. Service of an even character is naturally appreciated by subscribers, and their interests have at all times to be recognised. While so much depends upon the operator, it must not be forgotten that considerable responsibility rests with the subscriber, and here the need of careful supervision comes in. Subscribers are, of course, composed of all classes, but in every instance it is possible by courtesy, patience and tact so to influence them that they will unite in bringing the service up to the highest standard of excellence. Without any departure from the standard operating expressions it is possible so to train subscribers that they will in the course of time become nearly, if not quite, as official in giving calls as the operators are in receiving them. The incorrigible office boy has the reputation of driving operators to distraction; but I think that for much of his boyish tricks the operators in some cases have themselves to thank, for, had they always treated him with strictly official courtesy, he would not have dared to take a liberty. The work of a clerk-in-charge has in recent years grown very considerably, and I think it has tended generally to an improvement in the service. On the clerk-in-charge depends the correct training of the operators, and any failure to comply fully with the service demands on the part of the operator reflects discreditably upon the instructress. These complaints are fortunately rare, as the Company takes special care in the selection of these officials. Only the most intelligent and conscientious operators can hope to attain to these positions; but there is every prospect of advancement to all who have the ability, and care to qualify. Enthusiasm, as you will all agree, is infectious, and unless a clerk-in-charge and supervisor has a wholehearted interest in the Company's work, such a feeling cannot prevail among the operating staff.

Now with regard to the qualifications that an operator should possess; these are many, and among the most important must be placed smartness and businessability. It is not sufficient to acquire a bright, cheerful voice. An operator should keep herself abreast of the times, and should be in possession of all information concerning her work by carefully perusing the Service Instructions that are issued from time to time, so that when a subscriber makes an enquiry, she is able to answer him promptly and correctly. This does not apply of course to exchanges where there is a clerk-in-charge, but in the smaller exchanges it is essentially applicable, because there the operator is her own supervisor, and naturally subscribers expect her to be fully acquainted with all matters regarding the service. She should be able to explain any break that may occur in his service, and to satisfy him that everything possible had been done to remedy the defect. I would like to emphasise the importance of operators learning as much as they can of the maintenance side. This I am sure will appeal to the inspectors, whose work would be greatly facilitated by operators reporting faults as fully as possible. Where due regard is paid to these qualifications, subscribers gain confidence in the operator, and while they find it a pleasure to be connected with the telephone, the work of the operator is very much lightened.

It is at sub-exchanges where the operator is most in need of instruction. Due allowance must of course be made for the fact that such an operator does not gain so much experience as an operator at a busy exchange. Perhaps one of the greatest difficulties that sub-exchange operators have to deal with is the operating of a call from a line fitted with an automatic box. Many of these lines are used by all sorts and conditions of men, and it is frequently quite a business to instruct them in the proper use of the telephone. Exasperating as this often is, it is by no means so troublesome as the effort involved in the duty of insisting on the placing of the necessary pennies in the box. Here it is that the operator requires to exercise patience and tact. She should never, even though the individual at the other end be most refractory, lose her head. The operator should recognise that the caller who so behaves is a novice. In this district, so far as my experience goes, it rarely, if ever, happens that a caller deliberately attempts to avoid payment. To an operator who deals chiefly with this class of work in larger exchanges, some concession should be made with regard

\* Paper read before the Gloucester Telephone Society, session 1909-10.

to her load. It is not fair to expect her to get through so many calls as the other operators whose duty, comparatively speaking, is smooth and straightforward.

Although ticket diagrams and printed instructions have been issued to the attendants and operators in the various exchanges, ticket recording, more especially so at the sub-exchanges, is not yet up to the standard point. At these exchanges operators and attendants do not realise the fact that the fee clerk at the district office cannot ascertain whether the ticket recorded is a chargeable one or not, unless he is guided by a distinctive mark thereon, especially in the cases of delayed calls. Several attendants are under the impression that the "No call" ticket recently appended to the ticket diagrams is now intended to be made out for trunk enquiries. Although the service instruction reads that the ticket is to be made out in the event of an enquiry *re* a delayed call, of course the actual meaning is "No call made." In the event of a trunk enquiry, in most cases the subscriber is connected direct to the trunk exchange; if not, the enquiry is made by the operator herself on his behalf; therefore a call is made. Frequently operators complain that Service Instructions are revised too often, and that as soon as they have learned to do a thing in a particular way they are instructed to do it in another. I have pointed out that all these instructions are framed with the object of improving the service, and that the operators should not shirk any little extra trouble involved in the revision.

The work of a travelling supervisor is responsible and important, and to carry it out successfully one requires a good deal of confidence and an unlimited amount of tact. At first the operators, especially those in the smaller exchanges, look upon the travelling supervisor with a good deal of suspicion, but with time this feeling wears off, a mutual confidence is established, and the supervisor is enabled to render very considerable assistance to those whose operating was hitherto weak. When the supervisor has won the good graces of the operator she is able to bring the service up to a uniform standard of efficiency. One of the first duties of a travelling supervisor is to break down the hitherto isolated and independent working of some exchanges where formerly the operator was practically her own mistress, and knew that she was pretty safe from criticism, unless an especially exacting subscriber reported her. The travelling supervisor is in a position to check all irregularities, and to insist upon the best possible service being given in sub-exchanges.

I hope I have not wearied you by the reiteration of much that must have been common knowledge to many, if not all of you. I have endeavoured as far as possible to express a few personal experiences, and must ask you to excuse me if I have failed in my endeavour to interest you, as this is the first paper it has been my pleasure to prepare.

### THE CLERK IN LITERATURE.

By W. H. GUNSTON.

THE admirable and thoughtful paper by Mr. J. F. Scott on the "Psychology of the Office," recently published in the JOURNAL, suggests some considerations of the duties, hopes and aims of the complex and ill-comprehended genus *clerk*. Possibly no word in the language contains a vaguer significance than the word "clerk," and no calling or occupation is more widely divergent equally in its nature, its essential duties and its social status than that of the clerk. Describe a man as a "clerk" and you no more "place" him than if you said he was an Imperialist, a Bimetallist, a Roman Catholic or a member of any other comprehensive family. He may be the equal and associate of men of rank or infinitely lower than the smallest petty shopkeeper. He may be a highly educated man, engaged in work demanding a specialised intelligence, or he may be ill-educated and shiftless, performing the humblest routine in the most inefficient way, without thought, without care, without outlook; and between these two extremes lie all the numberless grades, different in slight degrees each from other, which are usually found in all things human. Perhaps the plastic nature, the lack of definiteness in the clerk's profession, as a whole, gives it all the wider scope and all the greater possibilities. A

youth of ambition entering an office may be condemned eternally to make entries and cast up columns, or he may have the opportunity of exercising a keen intelligence, of mastering the details of the business and making himself so invaluable that the widest and most promising vistas open out. Perhaps also in the clerk's, like higher callings—literature for instance—it is just because the more particular excellencies of it cannot be taught and must be discovered that comparatively few achieve high success in it. Bookkeeping, shorthand, languages can be taught; method and punctuality can be inculcated; but that which lifts a man out of the ordinary rut must come from within himself. Of course, it may be inspired by example, stimulated by interest and aided by help and advice, for I do not pretend that clerks, like poets, are born and not made.

It is perhaps not too much to say that literature generally deals very unfairly with the clerk. You get the poor, but honest, overworked, subservient species; or the conceited, ill-bred, over-dressed specimen who considers himself "a perfect gent." Possibly that larger, intermediate and most representative class of clerk which lies between the more favoured Government official and the half-educated, unprogressive class from which the comedy examples are drawn, presents little attraction to the writer. Again, social and educational conditions have changed so greatly since the times of Dickens and Thackeray that it is difficult to say whether the types they draw were representative or capriciously selected and exaggerated.

Mr. Guppy, Dick Swiveller, Mr. Chuckster, Mr. Jackson (in Pickwick), Bob Cratchit, maintaining a large family with some semblance of decency on fifteen shillings a week, and the clerks in Thackeray's minor stories are all creatures of delight and wonder, but one does not somehow figure them, as a class, as helping to maintain the commercial or legal efficiency of England. I am aware that readers may confront me with quite numerous examples of more orthodox and less fantastic clerks drawn from writers of all calibres, but I think it will be admitted that the general tendency of literature is to present the clerk in a somewhat unfavourable light, endorsing perhaps a widely prevalent view of the clerical novice as one who without sufficient money to embark in trade or sufficient special training to enter a profession, chooses the livelihood of clerkship as "respectable," and who looks down on the often better equipped and better paid artisan. As regards better equipment, except in the limited field of his trade, the artisan is generally inferior to the average clerk, especially in that vague region known as culture, if I may use that much abused word to imply general education and reading. But in the "better paid" lies the sting, for that anyone should imagine he can look down on another who is better paid, or that general culture, however great, should look down on specialised money-earning knowledge, however small, is to the average man repugnant both to propriety and good sense. Hence in considering the clerk as a fair target for its shafts of humour, literature has the sympathy of the large majority.

The humourist will always find plenty of material amongst the clerks of to-day, as, indeed, amongst all classes of people. But an undoubted opportunity exists for an author to draw a "type" of clerk in the true sense of the word—one who is really *typical* and not exceptional.

### NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY (LONDON).

The following grants were made during December:—

Case.	Department.	Amount.	Remarks.
325	Contract ..	£2 0 0	To widow of deceased member.
326	Maintenance ..	3 0 0	Illness of wife.
329	Construction ..	4 6 6	Illness of member and family.
328	Engineers ..	5 0 0	Personal illness.
330	Engineers ..	8 17 0	" "
331	Met. Stores ..	7 0 0	Illness of family.
332	Traffic ..	2 0 0	Personal illness and death of father.
		£32 3 6	

Total number of grants made since formation of society, 312; value, £974 0s. 10d.

Amount of subscriptions received during December, £17 18s. 10d.

Donations received, £18 4s. 2d.

Membership: New, 29; ceased, 74; number of members at Dec. 31, 2,906.

J. E. G. H.  
 G. BUCKERIDGE. A. H. DYER. P. J. MANTLE. COLLINS. WILKINSON. A. E. ABBOTT. J. TAYLER. R. M. TEEBOON.  
 G. KNIGHTON. H. C. TOWNSEND. R. J. FERGUSON. S. CRADOCK. F. GROVE. J. A. JENKINS. A. WARE.



MISS F. J. MINTER. C. F. ARROWSMITH. W. B. BENHAM. MISS E. M. RALPH.  
 H. F. E. DEANE. J. F. EDMONDS. H. G. CORNER. R. S. WARD

## LONDON AND ITS ORGANISATION.

### TRAFFIC DEPARTMENT.

BY J. STIRLING, *Metropolitan Chief Accountant*, AND  
 J. F. EDMONDS, *Metropolitan Traffic Manager*.

In a general article dealing with so many ramifications as are to be found in traffic work, it is impossible to treat the subject adequately, as each branch of the work touched upon could without difficulty be made the theme of a separate article. It becomes necessary, therefore, to deal only with the main features of the organisation of the London Traffic Department, and, as far as space can be found, to include some facts of interest tending to show the growing importance of the work.

Before the reorganisation of the Metropolitan staff in 1905, the management of the exchanges was in the hands of the various district managers, and the exchange managers then controlled the maintenance of the exchanges as well as the traffic. Under such circumstances it was not possible for the service to be adequately studied. It is an interesting fact, however, that some branches of traffic work, such as the engagement and training of the operating staff, additional staff and the provision of junctions had, for a considerable time prior to the reorganisation, been controlled from a

central point. Probably traffic work, in London at least, has always lent itself to functional organisation in a more pronounced manner than some other branches of the service, and the great strides which have been made during the past five years amply prove that the alteration carried out in 1905 has been more than justified.

All traffic studies have much in common, the extent and complexity naturally varying according to the size and nature of the business. If we compare the telephone with railway traffic, for example, many similarities can be seen, even without any inner knowledge of railway organisation—there is the same strong human interest, the fascination which invariably accompanies it, the varying demands of the client, due to seasonal needs, political changes, the rise and fall of markets, the weather, and a hundred other causes and caprices which afflict men and women wherever they follow their gregarious tendencies; there is also the knowledge that the aim of all effort is the perfecting of a system which has become necessary, not only to the business world, but to human society. As examples of the traffic fluctuations which have to be dealt with in London the following are not without interest:—

His late Majesty King Edward VII. died May 6, 1910.

Calls at London register exchanges—

For two weeks ending May 7	...	...	5,905,000
" " " " May 21	...	...	4,913,000
" " " " June 4	...	...	5,692,000



During Stock Exchange rubber boom—

Average calling rate on London Wall Exchange 87 per line, per week: as against 67 for same period of 1908 and 73 in 1909.

The real importance of traffic work can be better appreciated, however, when it is remembered that the design of the modern switchboard is largely the result of traffic studies. The rate of calling, the operator's load, the method of operating have all to be considered. The study of junction traffic and peg counts makes it possible for the work to be carried on in an increasingly efficient and economical manner, whilst the operator's work is made smoother and more straightforward than before.

The revolution in exchange organisation resulting from systematic and scientific study, and the increased care and attention bestowed upon the service, is accentuated when we remember some of the free-and-easy methods which prevailed in the early days of telephony, whilst its pioneers were groping towards the light. Many stories of those ancient days are still current, and it becomes increasingly difficult to decide whether the laugh which they invariably arouse springs from genuine amusement at the incidents or from delight that anyone should have the courage to retell tales which even our youths are beginning to regard as ancient. So quickly is telephone history made.

The London Traffic Department is unique in Europe because of the extent and variety of the territory which it provides for, and the consequent telephone problems of which it has to find the solutions. In the Metropolitan area the Company has 61 exchanges, thirteen of which are within the County of London. The largest are Gerrard and London Wall, both of which have over 8,500 lines; the smallest is Chigwell, with seventeen direct exchange lines. The area extends from Waltham Cross in the north to Reigate in the south, and from Tilbury in the east to Southall in the west. (See Fig. 1.) The Post Office has 23 exchanges, and, as the subscribers on either system are entitled to intercommunication with those on the other, the task of the Company's staff in dealing with and controlling the junction service is made still more complicated. The different classes of service too are fairly numerous, and some of them, provided for on old contracts, are not to be found in the current schedule of tariffs.

It has become almost a commonplace to say that the present-day uniformity and efficiency of operating procedure owe more to the introduction of the central battery system than to any other cause. Indeed, we have now got into the habit of treating the date of conversion from magneto to central battery working at any exchange as a sort of landmark, so outstanding has been the effect created. At the same time we have been able, by improved supervision and more adequate study of traffic conditions, to make the efficiency of service at magneto exchanges almost as great from the subscriber's point of view as that rendered under central battery conditions.

The following figures will serve as an indication of how the telephone habit has grown in London during the last five years:—

Exchange telephones in use on the Company's system in London increased from 70,546 to 120,588 in five years, while in the same period the number of originating calls per day has gone up from 469,049 to 743,621. This means that in the course of a single year over 180,000,000 messages are passed. The junction circuits have increased from 7,230 to 10,127 in order to meet the demands of this traffic, and whereas in 1905 the number of working "A" and "B" positions amounted to 991; in 1910 they numbered 1,186. Lastly, the total traffic staff has increased from 1,786 to 2,364.

The illustrative map (Fig. 1) shows the fifteen exchange managers' districts into which the area has been divided for traffic purposes. In the congested sections, such as in the City and at Gerrard, only one exchange is controlled, but in the less busy and more outlying parts a district consists of a group of exchanges controlled by an exchange manager situated at the most important of the group. The central control office is at Salisbury House, where the traffic manager and his three assistants are located, and from there emanate all general instructions, decisions on questions of policy, methods of administration, and the numerous other points on which responsible officers have to pass judgment or bestow guidance. Fig. 2 shows the chief divisions of work and responsibility, but for convenience details of the staff controlled are given

only in two exchange districts, viz., Gerrard (a central battery, highly developed, one exchange district) and Dalston (a composite district in which are situated several exchanges of different types). It should also be noted that although the exchange managers are under the direct supervision of assistant No. 2, the other assistants obtain all data and reports dealing with the subjects under their jurisdiction direct from the exchange managers, and likewise issue direct instructions on such matters. A photograph of the principal traffic officers in London is reproduced at the top of this article.

A glance at the headings under which each assistant traffic manager's duties are defined will show very conclusively their varied and interesting nature. The senior officer, who is responsible for studies, development and costs, has an almost inexhaustible field for research: his very able article on "The Telephone Load Line" which recently appeared in these pages contained some

#### THE NATIONAL TELEPHONE CO. LTD.

DIAGRAM OF METROPOLITAN AREA, SHOWING

#### ARRANGEMENT OF EXCHANGE DISTRICTS.

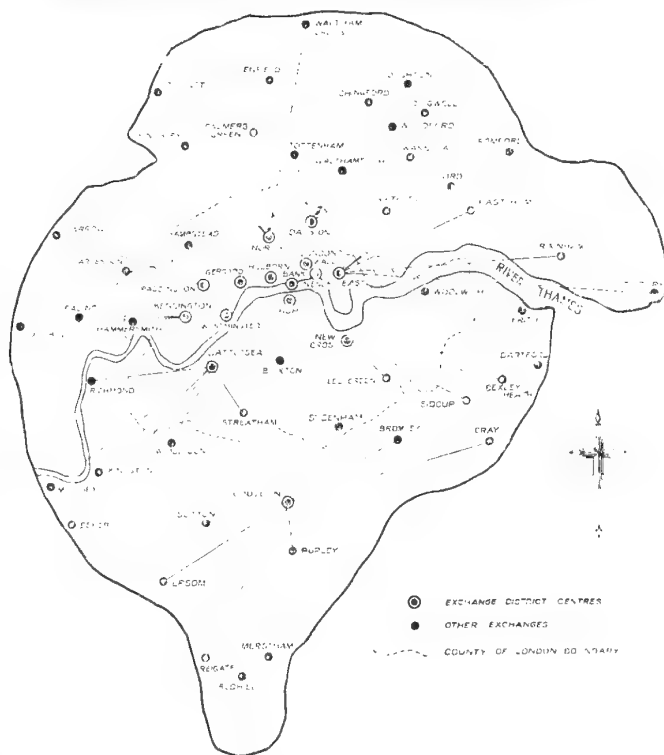


FIG. 1.

worthy specimens of the fruit produced, and render unnecessary any comments on the topics of which it treated.

A few of the matters coming under purview are the valuation of telephone calls, the efficiency of operators under varying conditions, operators' loads, estimating for operating staff in advance of the traffic, questions affecting the capacities of exchanges, number of cords required per position under varying traffic conditions, and operating expenditure in its relation to work done. Were it not that matters of a contentious character cannot well be dealt with in an article of this nature much might be said on the best method of arriving at operating costs for comparative purposes. The cost per 1,000 calls (reduced to local value) basis has been used for a considerable time by the Metropolitan Traffic Department. At exchanges where the calling rate increases, this basis has been found the most satisfactory for comparative purposes. It must of course be based on reliable statistics representing as nearly as possible the correct valuation of calls. We hope that the day may come when such a system may be universally adopted. Before this can take place, one or two points of a controversial nature must be settled, such as, what constitutes a unit call and some easy method of correcting differences due to higher or lower average salaries.

The period of tutelage is five weeks, during which the budding operator is taken through all the stages of actual exchange work, prior to being drafted on probation to a vacancy at one of the exchanges. The probationary period lasts, on the average, three

months, the actual time depending on the rapidity with which the operator attains proficiency; at the end of that period she is fully fledged, and is then placed on the exchange staff. The maximum number of girls in the school at one time is 60, and there are eleven teachers, all thoroughly qualified to instil into their pupils sound telephone principles and practice. Since the school was opened in 1899, 4,747 girls have passed through a course of training, and during the past five years, the number trained has been 2,025. About three years ago, it was decided that every member of the traffic staff then exercising controlling functions should pass through the school course of lectures. The total dealt with under that arrangement was 414, and as many availed themselves of the opportunity afforded of criticising the procedure and methods, many valuable points were obtained by the Company, and a progressive influence brought to bear on the staff themselves. As an example, one suggestion made by a critic was that learners should visit exchanges at an earlier period during their course of tuition, so that they might obtain a general idea of what practical exchange operating meant, and that they should be given more facility for acquiring the "telephone ear" than existed in the practice room; the latter part of this suggestion has since been carried out by means of a system of dictation by telephone. This is one of the ways in which the school has been rendered more efficient, for it must be remembered that these criticisms are made by senior members of the operating staff, under whom the learners are subsequently placed. All call office attendants and night operators are also required to undergo the period of school training. This training ground, with its appliances and special staff, does undoubtedly give the Traffic Department an immense advantage over other departments which have no such facility, and also shows the importance attached by the Company to the furnishing of that efficient service by which more than anything else the public appraise the value of the telephone. As far as operators are concerned the school training lasts about five weeks. It is difficult to say how long it took a learner in the old days, when she was placed under the care of an operator at the switchboard, to acquire that knowledge which is imparted to her in a scientific manner in a comparatively short time under present conditions.

(To be concluded.)

### THE PRIVATE BRANCH EXCHANGE AT THE GRAND HOTEL, SHEFFIELD.

By F. BARR, *Sheffield.*

In the installation of this exchange it was decided, after due consideration, to adopt a dry-core lead-covered cable distribution throughout. This was both more economical and efficient.

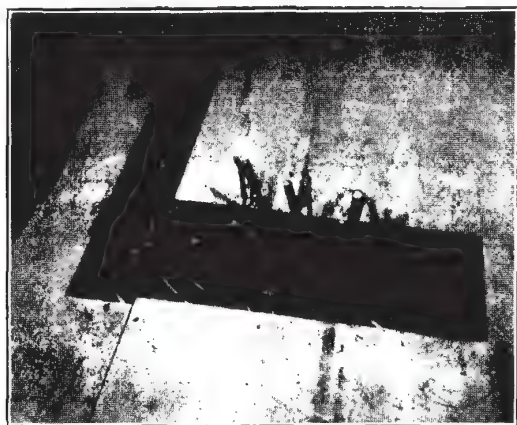


FIG. 1.—CABLES LAID READY FOR JOINTING  
(BOARDS REMOVED).

The work had to be carried out during the construction of the building. I need hardly describe the difficulties in dealing with a

work of this description in a building lighted only by flare lamps during the greater part of the time, with plasterers, joiners, painters and so forth, knocking up against you at every turn, and, in addition, with a clerk of the works on your track to hurry you up. The building had to be completed in a given time, and naturally no time was lost by the staff in carrying out the work.

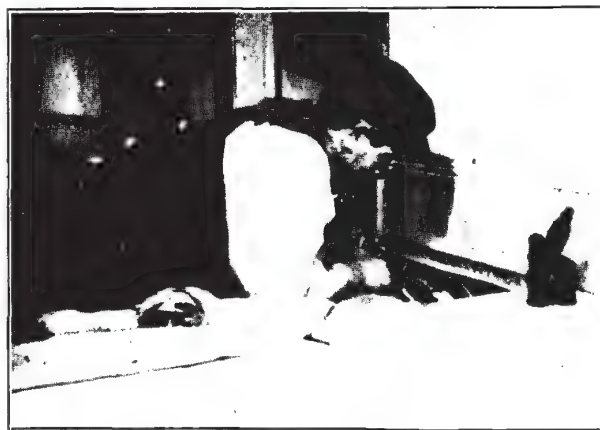


FIG. 2.—JOINER AT WORK.

The floor boards were grooved and tongued and pressed together by screw jacks, and it was therefore a case of splintering them up with a crowbar before the joists could be grooved and the cable laid. All the joiner's work in connection with the cable-laying was carried out by the contractor's men, placed at our disposal. At each joint hole a false floor was fitted between the joists and a cover made to fit the hole. All boards moved for our operations were, when replaced, screwed and not re-nailed down. The object of this will be apparent.

The first cables on the top floor was laid by a foreman and gang, but the remainder was mostly laid by a wireman, assisted by a lad.

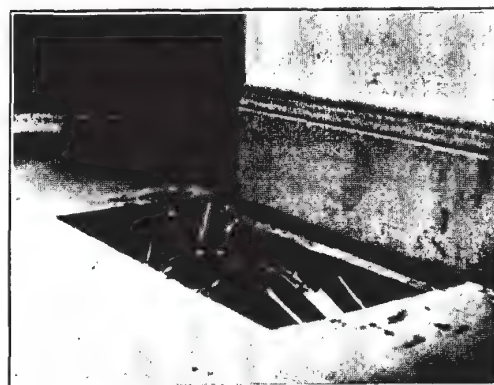


FIG. 3.—SHOWING METHOD OF BUILDING-UP CABLES.

The jointing was carried out by one joiner, and the method of jointing the one-pair cables to the main cables was suggested by him. A pothead was made wherever the one-pair cables left the main cable. Each single cable was tinned before jointing, and the cables built up and wiped in batches of three.

The illustrations will more fully explain the methods of running and jointing the cables.

The one-pair cables terminated on the bell boxes of each instrument, the ends being dipped in melted beeswax before fixing to the box. A distribution plan was drawn up before operations commenced, and a blue print of each floor given to the men running and jointing the cable. At the completion of the work floor plans were obtained from the architects (Messrs. Cannon & Chorley,



Leeds). These were mounted on linen, and a complete record, including the exact position of cable runs and joint boxes, was marked upon them for future reference.

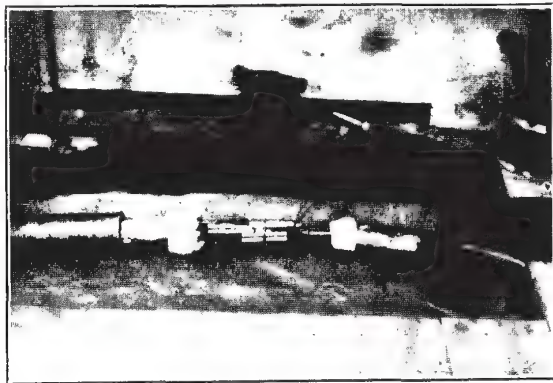


FIG. 4.—JOINT READY FOR SLEEVE

The test frame and cabinet was designed and constructed locally, and the fitting up of the exchange was carried out entirely by the local staff.

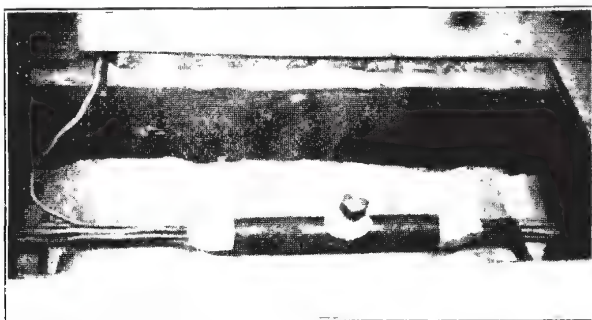


FIG. 5.—JOINT COMPLETED, WITH ONE-PAIR PASSING INTO BEDROOM.

The switchboards consist of two No. 2,501 sections, one 9-inch cable turning section and one end panel, and serves 250 stations fitted with five junctions. The current is supplied from the accumulators at the Central Exchange.



FIG. 6.—JOINT MADE AT RIGHT ANGLES TO LAY OF CABLE ON ACCOUNT OF POSITION OF JOINTS.

The hotel provide their own operators, the day operators working from 7 a.m. to 3 p.m.; 3 p.m. to 9 p.m.; and night operator from 9 p.m. to 7 a.m.

## ON THE EFFICIENCY OF INTER-URBAN TELEPHONE LINES.\*

*Translated and abridged by G. M. B. SHEPHERD.*

REFERENCE is made to an article recently in *E.T.Z.*, 1910, page 20, describing recent improvements in loading. Experiments have shown that, using double coils, no troubles from the unbalancing of aerial lines, and consequently induction, now arise. The conductor resistance is the governing factor, and is considered in detail. Large diameter wires are affected by the Kelvin skin effect, in accordance with the laws of Maxwell and Rayleigh, and three cases are herein dealt with: viz.: (1) copper or bronze wires having  $\mu = 1$ , (2) iron wire  $\mu > 1$ , and (3) bi-metallic wire containing iron.

(1) *Copper or Bronze Conductors.* The following are calculated figures at 900 ~:—

Diam. of copper wire in mm.	...	1	2	3	4	5	6	8
Increase in resistance, per cent.	...	0	1	5	15	37	69	20

The following table gives a comparison between theory and actual experiment for different frequencies (copper wire):—

	Increase, per cent. Calculated.				Increase, per cent. Observed.			
	1 mm.	2 mm.	4 mm.	8 mm.	1 mm.	2 mm.	4 mm.	8 mm.
600	0	0	17	32	10.1	0	3	18
900	0	1	15	69	20	0	6	17.5
1,200	0	2	27	117	34	0	9	27
1,500	0	3	41	179	54.4	0	16	37

And for a 5 mm. aluminium conductor:—

	Per cent. increase Calculated.		Per cent. increase Measured.	
	600	900	1,200	1,500
...	...	...	...	...
600	...	...	...	...
900	...	...	...	...
1,200	...	...	...	...
1,500	...	...	...	...

As seen, calculation and experiment do not agree very well, but the author considers the results satisfactory enough. In all cases the observed percentage increases are lower than those calculated by Rayleigh's formula. Skin effect is therefore of small importance on even the largest wires at present commonly used for telephony. If, however, very large conductors over 5 mm. should be employed stranding becomes necessary. Ordinary stranding, however, appears to be inefficient; thus a core consisting of 48 1-mm. wires equivalent to 69 mm. solid had the same per cent. increase at 820 ~ as the solid core. An improved method of stranding was proposed by A. Franke. In this it is arranged that each wire changes in position from centre to surface of the core. How this is done is not stated, but the results are excellent. Thus, for example, a core of sixteen 1-mm. wires, equal to 4 mm. solid, gave no sensible increase up to 3,000 ~ while the solid wire showed an increase of 1.6 per cent. at 1,500 ~.

(2) *Iron Conductors.*

Diam	Per cent. increase in R. at 600 ~		Per cent. increase in R. at 1,500 ~	
	Calculated.	Observed.	Calculated.	Observed.
1 mm.	...	3	1.8	1.8
2 "	...	4.0	2.5	2.3
3 "	...	16	about 60	about 58

For large iron wires the following experimental figures are given. They were made on a single specimen of wire by drawing same down from a large gauge, step by step:—

Diam. in mm.	...	1	1.5	2	3	4	5	6	7
Increase per cent. for	...	...	...	...	...	...	...	...	...
1,000 ~	...	...	8	3	12	37	80	125	190
Increase per cent. for	...	...	...	...	...	...	...	...	...
2,000 ~	...	...	2.0	12	36	83	145	210	294

Simple subdivision of iron conductors affords a considerable improvement, thus a 48 1-mm. core increased 24 per cent. at

\* Paper read by Dr. A. Ebeling before the Paris Conference.

1,000 ft., while the equivalent 6.9 mm. solid increased 190 per cent.

Steel wires whose  $\mu$  is about two-thirds that of iron show the skin effect less. An example is given of a steel line which has given excellent results in Württemberg. The wire is 2.2 mm. diam. At 1,000 ft. the increase in resistance was only 4 per cent., and a cable composed of three of these strands, equivalent to 3.8 mm. solid, showed an increase of only 4.6 per cent. The author considers this result important, also doubts the practical advantage of specially stranding conductors of iron or steel in the manner proposed by Franke.

(3) *Bimetallic Wires*.—These are of two types, viz., copper over an iron or steel core, forming one homogeneous wire, and iron or steel wires wound over a central core of copper. Neither of these types have given really good results. The author's experiments go to show that aluminium and iron is a good combination, though higher in resistance than copper and iron, and the following electrical tests of composite aluminium and iron conductors are given:—

No.	No. of iron wires.	Diam. of iron wires.	No. of Al. wires.	Diam. of Al. wires.	Res. to direct currents per km.	—	Increase per cent. in R.
1	3	1.5	1	1.5	19	900	6.4
2	2	1.5	1	1.5	21	—	6.0
3	2	1.5	2	1.5	15	—	5.5
4	2	2.0	1	2.0	15	—	10.1
5	2	2.0	2	2.0	10	—	11.4
6	1	2.0	4	1.0	75	1,000	19.2
7	1	2.0	6	2.0	31	1,000	20.2

Numbers 1 to 5 above were made up by simple twisting of the wires together, while in 6 to 7 the aluminium wires surround the iron wire. The latter construction should have the longest life, as the iron is protected. Tests using steel wire are not completed yet, but these are expected to show smaller resistance increases; and composite wires of 4 to 5 mm., having a core of steel corresponding in resistance to 2.7 to 4 mm. copper, should not show a skin effect greater than 5 or 6 per cent.

Conclusions from tests are:

(1) A specially stranded copper conductor enables the largest wires to be used for aerial lines in telephony.

(2) Large iron wires cannot be seriously considered for open lines, but iron or steel in cables show skin effect to a smaller degree.

(3) Aluminium and iron or steel composite wires have been constructed which show a very small per cent. increase of resistance, and yet have a good conductance. The author finishes up aerial lines with relative costs of loading and equivalent heavy wire.

1 km. double 3 mm. bronze, loaded	... = 270 marks
1 km. one 1.5 mm. steel and six 1.5 mm. aluminium wires, also loaded	... = 200 "
1 km. double 5 mm. bronze, unloaded	... = 610 "

#### CABLES.

The question of the material for telephone conductors is settled at once in the case of urban telephone systems; copper only can be contemplated. Continuous loading by iron wire leads to bulky cables difficult to lay and handle. The insertion of Pupin coils is the right method for urban lines or long inter-urban junctions. The attenuation formula for loaded cables is:

$$\beta = \frac{R_l + R_{sp}}{2} \sqrt{\frac{C_l}{L_{sp}}} + \frac{A_l}{2} \sqrt{\frac{L_{sp}}{C_l}}$$

Where  $R_l$ ,  $C_l$ ,  $A_l$  are the resistance capacity and leakance of the cable.

$R_{sp}$ ,  $L_{sp}$ , the resistance and inductance due to the coils. It is seen from this formula, that given a certain line resistance, there is little use diminishing the coil resistance below a certain point, also for cables of low resistance, loading beyond a certain point is of no value.

The author concludes with the remarks that with cables of normal construction and coils of the best type, 1,000 km., talking is feasible with copper conductors not exceeding 3 mm.  $\beta$  may be 3.5 or 4 for cables, but should not exceed 2.5 for open wires because of the range of variation of insulation. Comparing loaded cables with unloaded open wire on this basis, it is found that for 3 mm. copper in cable loaded,  $\beta = .0026$ , and for 4 mm. copper (or bronze) open unloaded,  $\beta = .0026$  also. Hence the efficiencies of the cable and the open wire are the same under the conditions stated.

## THE CEASEMENT OFFICER AND HIS WORK.

By H. MORGAN, Northern District Contract Office, London.

THAT it is better to retain an old subscriber than to obtain a new one is an axiom with which every cessation officer will heartily concur, and it is because of the importance of ceasement work that I am endeavouring to supplement the London Contract Manager's interesting article in a recent issue of the JOURNAL with some suggestions as to how this branch of contract work can be more efficiently dealt with.

One very necessary requirement for ceasement work is a general knowledge, not only of the office routine, but of Service Instructions and apparatus. This will be readily understood when it is remembered that the ceasement officer is called upon to deal with all sorts of service difficulties in connection with notices to cease, and also with the issuing of disconnection orders, the passing through of change of rate agreements superseding contracts, and so forth. Each of these branches of ceasement work, too, can be dealt with along many different lines.

To take, for instance, an ordinary notice to cease. If the notice is in order a letter is sent acknowledging it and informing the subscriber that a representative will call in the course of a day or two regarding the matter.

Now this first call often decides whether or no the subscriber will eventually withdraw notice, so that it is of paramount importance that the officer deputed to call shall try and obtain from him an exact idea as to why notice has been given, as all subsequent dealings with the case are to a large extent influenced by the subscriber's attitude and the reason given for notice to cease.

Should the explanation be that removal is contemplated the ceasement officer should immediately inform subscriber that the Company is in a position to move his line, wayleaves and other circumstances permitting, at a fair charge, or in the event of a new tenant signing a new contract, removal can be undertaken free of charge.

This, of course, leads to new business and incidentally helps the chief ceasement officer to gain the sympathetic ear and hearty interest and co-operation of the new business men, but this I will mention again later. It may happen however that the notice to cease is given on account of alleged bad service, or overcharge for calls.

In either of these cases it will at once be seen how imperative it is that the ceasement officer should be *au fait* with and able to explain fairly lucidly the methods adopted by the exchange staff in dealing with calls both with regard to making connections and registration.

Let us now assume, however, that the subscriber has given notice to cease part of his installation only, and requires plug and jacks in place of an extension. Here the attitude taken by the ceasement officer must be an entirely different one, and by convincing argument he should endeavour to prove that, not only is it desirable and in the subscriber's best interests to retain the extension, but that the renting of plug and jacks beside would be a profitable acquisition to his telephone arrangements.

He probably scores twice here, *i.e.*, by the retention of the extension line and by new business to the extent of 10s. per annum.

It will be realised, therefore, to what an extent the intelligent and tactful ceasement officer can influence the weekly return, not only in the matter of retentions, but also the new business side, and it is scarcely necessary to add that it should be the chief ceasement

officer's constant endeavour to inculcate in those working under him the fact that knowledge in the directions previously mentioned—viz., Service Instructions, technicalities and apparatus—is a very necessary adjunct to, and a valuable asset in, all matters appertaining to his work.

In the event of every effort to retain the subscriber having proved futile, it will be necessary to issue a disconnection order at the due date, and here another important aspect of contract work comes under review.

Great care must be exercised in making out these disconnection orders, for upon the particulars given thereon the reading of the recovery works order depends.

Accuracy and clearness of detail should characterise the issuing of each one, and the folio number and class of service should be noted on the top of each, as this is a great help for reference, although no space is specifically allotted to these details on the form.

How necessary it is to give the fullest possible details will be seen when it is explained that should the fact that instruments have been previously temporarily recovered for safe custody not be mentioned, the fitter will be sent on a false errand, and, after spending two or three hours finding the house agents and obtaining the keys, will gain entrance to the building, only to find that the instruments are not there, but already safely reclining on a shelf in the stores.

Many other directions in which failure to give the necessary details on a recovery order will entail loss of time and money, will be obvious to everyone who considers the question.

In my opinion, whenever a disconnection order is issued the new business officer for the district in which the line is to be thrown spare should be advised, and here the value of co-operation is seen, for often by judicious and careful canvassing in the immediate vicinity, a new order can be obtained, and the work carried out in conjunction with it, thus increasing revenue, decreasing expenditure, keeping plant from being thrown spare, and last, but by no means least, obtaining very early completion of the line, which enhances the Company's reputation for expediency in dealing with all matters appertaining to its business.

Much more might be said along these lines, but space forbids.

Let us now consider for a short time the question of change of rate agreements.

Upon receipt of a subscriber's letter expressing a desire to change the rate, say, from message to unlimited service, the first consideration should be how much does this subscriber pay the Company in fees during the year over and above his rental. A call through to the message rate fee department and this information is readily given.

Often it is found that the subscriber is making anything from 250 to 400 calls per month, thus making a total amount paid to the Company, for one line only, of from £17 to £25 per annum. What stronger argument is wanted by a canvasser than this, that the subscriber can have two lines with auxiliary working for £23 10s. per annum, or a private branch exchange consisting of two lines, two extensions and the privilege of making 3,000 calls for £23 per annum. Actual experience has proved that in many instances where a subscriber desires change of rate he can be persuaded to rent a new line if business acumen and tact are displayed by the representative who deals with the matter.

Care should be exercised to ascertain whether it is necessary to change subscriber's number in changing his service, as sometimes a flat rate subscriber will continue on that basis sooner than change his number.

A tab should also be attached to any change of rate agreement before it is passed through, stating that change of number is necessary, as otherwise trouble will be caused through its not being noted on the works order.

Change of name agreements also require to be made out carefully, and subscriber should in every case have his attention drawn to the fact that all alterations must be initialled, otherwise valuable

time will be lost, and maybe several futile journeys made before the additions to his signature are obtained.

A great deal of tact and diplomacy is needed too, in dealing with subscribers who have given notice which is out of order.

But when it is explained to them that only by dealing with each contract strictly on its merits, and in accordance with the terms and conditions therein contained, can such an intricate system be worked upon a commercial basis, the way is paved for obtaining a substantial sum in cancellation of liability, or the suggestion can be made that subscribers should endeavour to find someone willing to sign a new agreement, thus continuing the service and preventing any loss from accruing to the Company in respect of plant being suddenly thrown spare.

Then the card system.

Much has been written in this JOURNAL from time to time on the importance of intelligent tabulation on the cards.

In no branch of the Company's operations is it more essential that correct and up-to-date entries on the cards should be made than in ceasement work.

A card not cleared at the proper time, or an entry omitted when papers are despatched to another department, or filed, will undoubtedly cause trouble and annoyance to someone at some time or another.

Not only does this apply with respect to the staff immediately connected with the department, for the Contract Department is a centre of all sorts of enquiries from other offices, more especially does this apply to the Rental, Message Rate Fee, Statistical and Engineering Departments, and in the event of the cards being inefficiently kept, delay is caused in replying to queries, or annoyance engendered by long waits on the telephone.

The whole question of carding, in fact, resolves itself into this: if the cards are methodically dealt with, the system is an immense boon and a pleasure, but if not it is nothing less than a nuisance.

When it is remembered that the Contract Department deals with the agreement, both at its inception and finish, and that a huge number of the engineering and fitting staff depend almost for their livelihood on the efficiency of the officers engaged in contract work it will be readily agreed that immense importance attaches to all its various branches. In these circumstances tenacity of purpose should characterise the efforts of each and every man engaged in its operations, whether he be in a high or subordinate position; his purpose being—get subscribers, retain them, and get more subscribers.

### CHEERFULNESS.\*

By PRISCILLA HAWKINGS, *Bristol.*

THERE is one thing which we have not heard much of in the papers given during the session, and one which every operator should cultivate. I refer to the necessary quality of "cheerfulness."

The operator's work becomes much easier when carried out in a cheerful spirit, and how much better it must be for the subscriber, when a pleasant, cheery voice answers his call. He may have been experiencing a trying time at the office, but if, on using the telephone, the operator's voice sounds pleasantly in his ear, he feels that she is taking a personal interest in him, and will do her best for him.

I think one of the best ways of educating subscribers is to make them feel that we are always doing our best for them, and they will be more likely to feel that, when they are answered in a pleasant tone, and their calls are efficiently dealt with.

Some subscribers are always ready to blame the operator for every difficulty experienced, greatly discouraging her, when she feels she has done her best. The average subscriber, however, is not unreasonable and if anything goes wrong, explanation in a nice manner will bring him to look at things in a less exacting way.

\* One of a series of competitive papers read before the Bristol Operators' Telephone Society, March, 1910.



## REVIEWS.

*The Development of the Telephone in Europe.* By Herbert Laws Webb. (78 pp., 1s. The Electrical Press, Limited, London.)—This is a comprehensive review of the rise and evolution of the telephone, and gives the history of its vicissitudes in Great Britain and the Continent. A comparison is instituted between American and English conditions, and the reasons why European communities are deprived of full benefit of the most rapid means of communication are clearly set out. Mr. Webb passes the telephonic condition of each European State in review, and as he speaks from personal experience his views carry exceptional weight. This very interesting book concludes as follows:—

To compute the loss which the peoples of Europe have suffered, and still daily suffer, through being deprived of the highest possible development of the most rapid means of communication, would be impossible; it is an immense, incalculable loss, just as the gain in saving of time and friction which the community blessed with an efficient and highly developed telephone service enjoys is immense and incalculable.

From the experience of America we know that an efficient telephone service, in which the greatest possible rapidity and certainty of communication over both short and long distances is made the governing principle, is capable of almost indefinite expansion—so deeply does this instantaneous means of communication enter into both business and social life. It may be asked—Why should not similar results, similar efficiency, and similar development be obtained under Government management? The best answer is the results of Government management in Europe during the past 30 years. The history of the telephone in Europe clearly shows that the “vested interest” of the Governments in the telegraphs has been allowed to check the natural advance of the telephone—the survival of the fittest has been artificially restrained.

Even if under Government ownership the management of the telephone were entirely separated from that of the telegraph, so as to eliminate this repressive influence, those who are familiar with the conduct of great Government departments, always necessarily subject to political control and political influence, would be the last to claim that a Government department can be an efficient substitute for private enterprise in the conduct of an industry where high efficiency, enterprising commercial policy, advanced technical policy, and sound and economical financial management are prime requisites for success. These are all the very antithesis of accepted Government methods; and, above all, the outstanding fact that under State management there is no man responsible for financial success or otherwise is sufficient always to prevent really successful and efficient working of a commercial enterprise by Government management. Financial soundness in the end governs the old thing—organisation, efficiency, commercial and technical policy—and the difference between the Government official and the business man is that the former need only produce accounts while the latter must produce the money. In the world of affairs, of iron and steel, brass and copper, steam and electricity, machinery, organisation and effort, it is not love that makes the world go round, but money.

The book is prefaced by an introduction by the well-known economist Mr. Harold Cox, lately M.P. for Preston, who, in criticising the handling of the telephone question by the Post Office, says drily, referring to the “exorbitant royalty of 10 per cent.”: “It is interesting to observe that down to the year before last the Postmaster-General in his published accounts treated his receipts from this royalty as part of the revenue earned by him on working the telegraphs.”

*Electrical Engineering Abstracts.* Jan.-Dec., 1910. (International Institute of Technical Bibliography, 57-58, Chancery Lane, London.)—This useful compilation constitutes Section II. of the journal of this institute, which has been founded and promoted to organise an international, registration of engineering knowledge, by publishing a fortnightly bibliography, abstract and index of all useful scientific and technical articles appearing in technical journals, proceedings of institutes, etc., all over the world, and by supplying its members with information in other ways. Members receive one section of the journal free of charge, while to non-members the subscription for one section is 24s. for the year. The work certainly forms a valuable and up-to-date record of what is being published in the scientific and technical world. It also comprises a summary of new patents. It should be mentioned that summaries of the English and American articles and patents are in English, the German in German, and so on.

*Calculations in Telegraphy and Telephony.* By H. P. Few. (Rentell & Co., 2s. net.) This little book is a compendium of numerical questions set at the City and Guilds examinations on telegraphy and telephony during the past ten years. Apparently

the examiners have been complaining bitterly of the manner in which the majority of candidates deal with calculations, and accordingly the author sets forth the various algebraical and arithmetical steps of the 70 or 80 problems included in the book with painstaking fulness. We find most of the old inquisitions into weird combinations of cells and condensers, that examiners are so fond of, stated in many different shapes and forms. The filling of spools with wire to a specified resistance is also a popular torture, though very few honours men could afford time to answer a question of this kind in the elaborate and circuitous manner shown on pages 41, 42, 43 and 44. Only three hours is allowed for the whole paper, but the practical man will see that, having arrived at the diameter of his wire, there is no need to evolve another imposing formula to give the total length on the bobbin.

On page 32 appears one of the C. and G. pet questions on transmission. We think it is a pity that questions of this kind should still be persisted in. The general principle that a metallic circuit must be equal (even approximately) to the single wire with earth return is as fallacious as the K.R. fetish itself. It is perhaps hardly fair to blame a candidate for answering a fallacious question by a fallacious answer in order to gain desirable marks; but we think that the reply to a question such as that on page 32 might well be worded so that modern principles are upheld without unduly treading upon examiners' corns. The book, anyhow, fulfils the purpose for which it was written, and can be recommended to all preparing for the C. and G. examinations. It is neatly got up and of convenient shape and size.

*The Journal of the Municipal School of Technology (Manchester, Volume III).*—The third volume of this journal is in no way behind the previous numbers. Both in the subject matter and as an example of the publishers' art, it is a credit to the school which has produced it. It cannot be expected that all the papers reprinted will be of direct interest to every reader, dealing as they do with subjects varying from “Flash-over Voltages” to “The Colouring Matter of Mummy Cloths.” Messrs. Curcliffe's paper on “Vagabond Currents” is the one which comes nearest the sphere of the telephone man, though all the papers would repay examination as records of the progress for which the school is responsible in the application of technical science to practical problems. The republication of such records collected together under one cover is an enterprise on which the school is to be congratulated and one which should find ample reward in the increased estimation of the technical public for the school, and in the *esprit de corps* which it promotes among the students.

FROM AN INVENTORY STAFF  
CORRESPONDENT.

LIFE on the Inventory staff is not without its compensations. This has no doubt been realised by the majority of those members of the Company's staff at present without any fixed place of abode, and did time permit, Mr. Editor, you would probably be inundated with many highly interesting contributions regarding the work itself, the places and the peoples visited, experiences with landlords and landladies, etc., etc. If circumstances allow these may be forthcoming later, but in the meantime the staff of the “G” division wish to express their appreciation of the arrangements kindly made for the profitable spending of their few leisure hours by the Oxford local staff.

Our stay in the University city was a comparatively short one, and there was so much of historical and general interest claiming attention that it was found expedient to organise our little tours, and this task was taken in hand and most successfully carried out by Mr. Ward, the Local Manager. An official guide was engaged and accompanied by the members of the Post Office checking staff, we inspected many of the colleges and important buildings on two successive Saturday afternoons. The outing was very much enjoyed, and will be a pleasant memory for a long time to come.

On the evening of Monday, Dec. 19, a smoking concert was organised, and a company numbering about 50 assembled and had a very pleasant evening. Mr. Alan Roberts, Divisional Officer, who presided, was supported by Mr. T. Harrison, Supervising Office of the Post Office staff, and a well-sustained and enjoyable programme was contributed to by the local staff, the Department's staff and the Inventory staff. Unfortunately, Mr. Maclean, District Manager, was unable to be present.

The meeting from a social point of view was also highly successful, and we are greatly indebted to Mr. Ward and his assistants for the kindly feeling which suggested the function and for the admirable manner in which the arrangements were made.

## The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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[No. 59.]

### MUNICIPALISATION.

As some sort of agitation has been set on foot by one of the municipalities and some gentle stir been raised here and there in the Press as to the desirability or otherwise of allowing municipal bodies to work the telephone service within the limits of their boundaries, some brief consideration of the case may be not uninteresting. The Company, being under agreement with the Post Office to dispose of its plant to that Government Department at the end of the current year, is in a position to view the whole question dispassionately and to discuss it with academic calm. We, whose fate is also shaped by the Company's Agreement, can approach the matter in like mood.

What, then, are the advantages and disadvantages of municipal control of telephones? The friends of that system contend that the Corporations can work at a cheaper rate than the Government or the Company. But when they proceed to instance Hull as a proof of their contention, they show how ill-grounded are their deductions and how illusory their data. The capital cost per station at Hull has been widely advertised as £20 12s., while that of the Company is given as £31 10s., and of the Post Office as £52 8s. Closer consideration of these figures shows them to be worthless as bases of comparison. The Hull Corporation operates in a comparatively small, compact and homogeneous area; moreover it adopts the unusual procedure of debiting its telephone account with nothing for the valuable privilege of wayleave in its streets. How can this field of operations be compared with that of the National Telephone Company, which covers the whole United Kingdom, including such vast and complicated areas as London, South Lancashire and Glasgow, and more or less unproductive ones as those in remote rural districts. Moreover, Hull possesses the enormous advantage of intercommunication over the Company's vastly greater system and consequent free use of its plant, without which the success of the Corporation system

would be problematical. The Post Office figures not only include (like those of the National Company) a large amount of spare plant which has been laid down for future requirements, but also plant which is not spare but which has been leased to the Company.

A decided drawback to municipal control of telephones would be the heterogeneous collection of telephone systems which the various bodies would in their wisdom adopt. It is unnecessary here to labour this very obvious but important technical point. Another difficulty, which is no slight one, is that the amount of the capital embarked in the smaller systems would not be such as would justify or be able to command the advantage of the advice and services of well-paid experts. This is one of the many important difficulties which centralisation solves.

Again, an important point to be remembered is this. It is estimated that for the next five years an average capital expenditure of £5,000,000 per annum will be necessary by the State for telephonic development, and thereafter in ever-increasing volume. Are the Corporations, which already have some difficulty in obtaining loans for the already enormous requirements of existing municipal undertakings, willing to add another £25,000,000 to their indebtedness within the next five years? Capital, as we have always insisted, must flow freely if the telephone system is to be adequately developed, and in the national interest it is imperative that the future of the telephone should be in hands which have the power to raise and spend that capital.

A still broader question is that of the future telephonic development of the country. If we admit that the larger municipalities operating within their populous boundaries might give an efficient service with some sort of success, what becomes of their suburbs and what becomes of the numerous unprofitable areas covered by the boundaries of the smaller Corporations? Is it likely that the large boroughs will risk a deficit in order to extend the telephone to sparsely populated and distant environs? Is it likely that the small boroughs and there are hundreds of them—will embark in telephone administration at all? Is the State to have the privilege of telephoning all the unprofitable districts at the expense of the taxpayer? We think, in the event of municipal control of the telephone service, there is little doubt that the answer to the last question would be in the affirmative.

### COMPETITION AND DEVELOPMENT.

THE American journal *Telephony* returns to its charge of about a year ago wherein it sought to prove that the astoundingly rapid development of the telephone in America was coincident with the beginning of the competition between the independent companies and the Bell undertakings. This contention we went to some pains to refute in our March issue.

By boldly seizing and reproducing the diagram showing the growth of Bell stations which is published in the annual report of the American Telephone and Telegraph Company, and holding it up as evidence in favour of its case, *Telephony* appears to think that it has turned the enemy's elephants against them very neatly. In the year when competition began (1894) a black arrow is inserted in the diagram professing to show where the tremendously increased growth of stations begins. But one glance at the diagram shows

that this growth made no abnormal leaps until 1899 (five years later), and in our opinion as previously expressed, the splendid development which has followed since that year is due to two quite different causes. The one is the measured rate which has had such phenomenal success in America, and which brought the telephone in the large cities within the reach of the moderate user—for, after all, it is the addition of hundreds of thousands of subscribers in places like New York, Chicago, Boston and Philadelphia which tells, rather than the establishment of small exchanges in George City, or James City, or Sarahsville. The other is the simple fact that in the closing years of the last century the civilised world generally seemed, as it were, to have finally made up its mind that the telephone was a business and social necessity, and the development of the system went up by leaps and bounds not only in the great American cities, in London and in Berlin, but even in Paris and St. Petersburg. Without burdening the reader with a mass of figures we may give a few examples. In New York during the decade 1898-1907 the number of stations increased nearly tenfold; in London during the same period the increase was more than sevenfold; and in Paris more than threefold, while in Berlin the already large development existing in 1899 was trebled in the ten succeeding years. In none of these examples, which could be multiplied almost indefinitely, was there competition, unless the rivalry at agreed rates between the Post Office and National Telephone Company in London can be so called.

#### HIC ET UBIQUE.

THE Telephone Charges Bill now (Jan. 20) before the German Reichstag for discussion contains some important modifications of the original proposal. We learn from the *Zeitschrift für Schwachstromtechnik* that not only is the charge per call reduced from 5 pfennig (0.05 of a shilling) to 4 pf. (as already announced), but a measured rate has been introduced as follows:—

Up to 2,000 calls ...	...	£3 15s. per annum.
2,000 „ 4,000 „ ...	...	£7 0s. „
4,000 „ 6,000 „ ...	...	£10 0s. „
6,000 „ 8,000 „ ...	...	£12 10s. „
8,000 „ 10,000 „ ...	...	£15 0s. „

This, of course, is in addition to the annual payments varying from £2s. 10s. in the small places to £4 10s. and £5 in the great cities. The flat rate will be entirely abolished.

MAJOR W. A. J. O'MEARA read a very interesting and valuable paper before the Institution of Electrical Engineers on Dec. 15 last, entitled "Submarine Cables for Long-Distance Telephone Circuits," and describing the Anglo-French telephone cables. For reports of this paper and the full discussion which ensued we refer our readers to the weekly technical press.

As our paragraph last month regarding the recipients of awards for suggestions may give rise to misconceptions, we give a full list of the ladies who have been so honoured, in order of date. They are Miss Duggan (Dublin), Miss Minter (London), Miss B. Wood (London), Miss A. Chance (Dublin), Miss E. K. Reynolds (Bolton).

#### OLDHAM THRIFT CLUB.

A THRIFT club, which was inaugurated in September last in connection with the Oldham staff, has been taken up with some enthusiasm and interest. There are now nearly 40 members, and at the end of the first quarter there was a balance in the treasurer's hands of upwards of £50.

#### THE ADMINISTRATIVE GENIUS.

AUGUSTUS JONES was one of those  
Right worthy small contractors,  
Who in our country's greatness form  
Indubitable factors.

And as successfuller he waxed  
(To "worth" alone beholden),  
The chain upon his waistcoat grew  
More massive and more golden.

Duly elected, he assists  
In the deliberations  
Of one of those Town Councils,  
The despair of other nations.

And, slowly in his massive mind  
The public weal revolving,  
At length the Telephonic knot  
Seemed easy to his solving.

For as on Prophets in a flash  
Is sudden wisdom showered,  
On Jones to manage telephones  
A special gift was dowered.

He was not quite an engineer  
Nor an administrator,  
But something whispered in his ear,  
Than either he was greater.

He saw himself the Chairman of  
A Telephone Committee.  
Directing with all-powerful hand  
The service of his city.

An engineer may be employed  
(And also overriden):  
A manager may "manage"—so  
He do as he be bidden.

And should that service show success  
Less actual than moral,  
At least it can be hailed as Cheap,  
And Jones will earn his laurel.

—W. H. GUNSTON.

#### AN UNUSUAL CAUSE OF FIRE.

By F. W. FRANCIS, *Engineer-in-Chief's Department.*

A CURIOUS case of damage to the mouthpiece of one of the Company's Ericsson table sets was brought to notice by the district manager, Kirkcaldy, in June of last year. It appears that the instrument in question was fitted in the study of Dr. MacTier, of St. Andrews, and one morning, about 10 a.m., Miss MacTier, upon entering the room with some visitors, noticed a column of smoke ascending from the instrument to the ceiling, and at the same time the mouthpiece of the instrument was found to be "sizzling and cracking." She at once removed the mouthpiece and took it out into the garden for the purpose of cooling it, when it was noticed that a large hole was burnt through it. After it had been thoroughly cooled, Miss MacTier took it back to the room and replaced it on the instrument, when to the astonishment of herself and visitors it immediately commenced to smoke and sizzle again. It was removed once more, and this time it was discreetly left in the garden.

The district manager, Mr. John Storrie, was asked to make a thorough investigation into the cause of the burning, which was assumed to be due to the sun's rays being in some way concentrated on the instrument, and the first thing which suggested itself was that there might be some peculiarity in the shape of one of the windows, or that a knot or blemish in the glass was causing it to act as a lens. Nothing abnormal, however, was found in this direction. Then the presence of a glass water bottle or anything of this nature likely to act as a burning glass was looked for, but there was only a vase (used for holding flowers) which was in any



way suspicious looking; but this was not sufficiently high to account for the position of the burning. During the investigation it was noticed by the district manager that the earpiece was scorched on the underside furthest away from the window. It was therefore concluded that the most likely cause of this was a reflected sunbeam, and upon the sun coming out shortly afterwards the culprit was discovered to be a brass inkstand which was on the table just in



FIG. 1.

front of the instrument, which reflected the sun's rays on to the ceiling, where a distinct outline of the instrument could be seen.

The inkstand was kindly lent and forwarded to Head Office for the purpose of making experiments to see whether the burning effect could be repeated, but after waiting many days for the appearance of the sun in London the attempt was abandoned and resource was had to an arc lamp. The results are shown in the accompanying photographs. Fig. 1 shows the inkstand, which is of an unusual

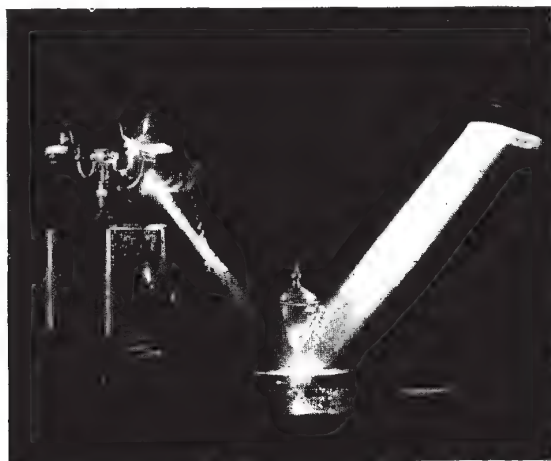


FIG. 2.

pattern, having a slightly concave circular base, which, being highly polished, acts as a parabolic reflector. Fig. 2 shows the beam of light from the arc lamp falling on the base and being reflected on to the mouthpiece, which was actually burning whilst the photograph was being taken. Fig. 3 shows the actual mouthpiece recovered from Dr. MacTier's instrument, and Fig. 4 the effect on several mouthpieces resulting from the experiment shown in Fig. 2.

The experiments are interesting as showing that celluloid will stand a great amount of heat without actually taking fire. A red-

hot soldering iron will cause dense fumes to arise, but will not cause the celluloid to burst into a flame; on the other hand, a lighted match will ignite it and cause it to burn fiercely, leaving very little residue. The experiments also show that fires may result from very simple and quite unexpected causes, as it is quite possible that had the sun's rays been concentrated on some inflammable fabric



FIG. 3.

instead of upon one of the Company's instruments a conflagration might have ensued, and possibly the instrument might have been looked upon with grave suspicion as the probable cause.

I am indebted to Mr. Cohen for arranging the experiments, and to Mr. Kingsbury for the photographs, which have been in



FIG. 4.

no way faked, except as regards the smoke from the mouthpiece in Fig. 2, which is pencilled in as it actually appeared, but which did not show clearly in the original negative, owing to the comparatively long time of exposure.

#### A SEASONABLE "FAULT."

DURING Christmas week a leading hospital in the West of England which has an auxiliary exchange line could not be got on the main line, and after a good deal of ringing by the exchange on the auxiliary instrument, the porter answered as follows:—"We cannot answer this telephone, Miss, it's decorated for Christmas."

#### NOTTINGHAM DISTRICT PROVIDENT SOCIETY.

THE annual general meeting of the Nottingham Provident Society was held on Jan. 6. The chair was taken by Mr. H. Saywell. Mr. E. FitzPatrick, the hon. secretary, read a report on the year's working, which showed a very satisfactory balance. It was decided that £15 should be distributed to various charities. The meeting then terminated with thanks to Mr. Saywell as chairman and to Mr. FitzPatrick for filling the position of hon. secretary for the past year.

## TELEPHONE WOMEN.

## LXXXIV.—ELINOR MARY JONES.

A BETTER example of the modern lady telephonist than Miss E. M. Jones, the Liverpool Matron, it would be difficult to find, even in a staff such as that of the National Telephone Company.



ELINOR MARY JONES.

The subject of these notes entered the Company's service on May 3, 1895, and worked in several exchanges as an operator until May 31, 1907, when, without filling any intermediate position, she was promoted to take charge of the then recently opened Operating School. In this capacity she successfully accomplished the very difficult task of teaching, not only the learners who entered the Company's service but, by means of a special post-graduate course, the whole of the Liverpool operating and supervising staffs, many of the latter being much her senior. Miss Jones, it is only right to say, was materially assisted at the time by the attitude of the senior clerks-in-charge of the district, who elected also to take the course, but the fact that much valuable instruction was received bears testimony to her tact and strength of character.

Upon the amalgamation of the Liverpool and Birkenhead districts in June, 1909, and the consequent formation of a Traffic Department, it became necessary to appoint a matron in order to deal with the engagement of new staff and to see to the operators' comforts during business hours. Miss Jones was selected for this position and has applied herself to the duties connected with it in her usual zealous manner.

A happy nature and a cheerful disposition make Miss Jones a genial and familiar figure with all branches of the staff, and these attributes are extremely valuable to one who has to undertake a large amount of sick visiting.

As president of the Liverpool Operators' Telephone Society (which last session maintained an average attendance per meeting of 133) she has shown herself to be a real enthusiast, and papers which she has read before that and other societies, indicate a

thorough knowledge of the business of operating. It is not surprising, therefore, that her presence in the chair ensures an enjoyable and instructive evening.

Miss Jones is an active member of the Liverpool District Swimming Club and confesses to a great love of books.

## LXXXV.—FLORENCE MAY THOMAS.

FLORENCE MAY THOMAS, Travelling Supervisor, Gloucester district, was born at Gloucester, but soon removed to Stroud, her father, Sergt.-Major Edwin Thomas, being appointed instructor of a company of Volunteers, now, of course, merged in the Territorial Force. She did well at school, and when the National Telephone Company opened the Stroud Exchange on Nov. 18, 1895, shortly after her father's death, she was appointed Operator. Although young, she proved a quick and intelligent learner, and showed marked ability in her work.

When first established in Russell Street the exchange had only 25 subscribers, but business people were not slow to recognise the advantages of telephonic communication, and so rapidly did the service grow that some seven or eight years ago it was necessary to transfer the exchange to more commodious premises in London Road. The staff, too, was increased, and as Senior Operator Miss Thomas performed her responsible duties with efficiency, courtesy and tact, and when on April 26 last year she was appointed Travelling Supervisor for the Gloucester district the subscribers, now numbering 200, presented her with a gold watch, suitably inscribed, a gold brooch and a travelling bag. Devoted to her work, the conscientious manner in which she managed the service was appreciated by the three district managers and three local managers under whom she at different times served. Essentially a telephone woman, she has never lost an opportunity of making herself thoroughly acquainted with the details of the telephone service. As Travelling Supervisor she has gained the



FLORENCE MAY THOMAS.

confidence of the members of the staff, who now look forward to her visits and seek her advice, which they rapidly follow, with the result that the service over which she has control has greatly improved. Miss Thomas's recreations are reading and walking.



## INCREASED HEAT—REDUCED EXPENDITURE.

By F. BARR.

THE three sketches here shown are almost self-explanatory.

The idea embodied in the sketches suggested itself to me to meet a difficulty that had arisen in two of the Company's sub-

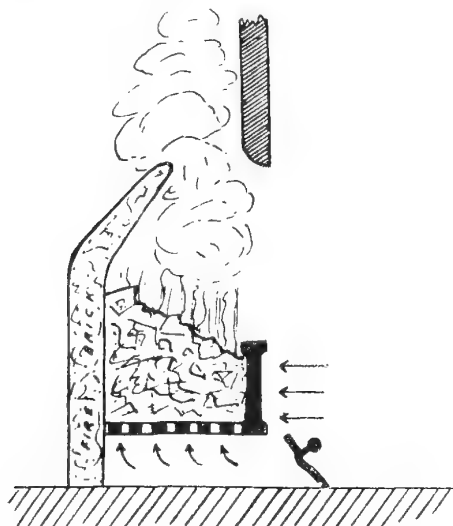


FIG. 1.—SECTION OF FIRE GRATE AS AT PRESENT.

exchanges, with regard to insufficient heating. The operators complained, and to obviate the necessity of changing the old pattern existing fire grates, I tried the plan of converting them into semi-slow combustion.

The difficulty has now been overcome, and it has proved satisfactory in two important directions—firstly, by giving increased

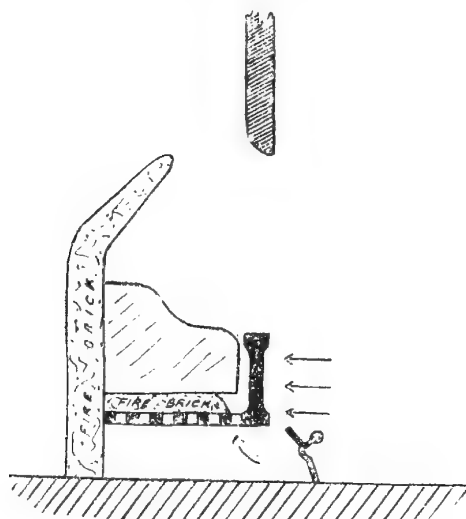


FIG. 2.—SECTION SHOWING FIRE GRATE CONVERTED TO SEMI-SLOW COMBUSTION.

heat, and secondly, in an appreciably decreasing consumption of coal, so that both the Company and the operators in different ways benefit by the change.

The writer has benefited personally by adopting the idea at his own private residence, and he can safely recommend it to the notice of other members of the staff.

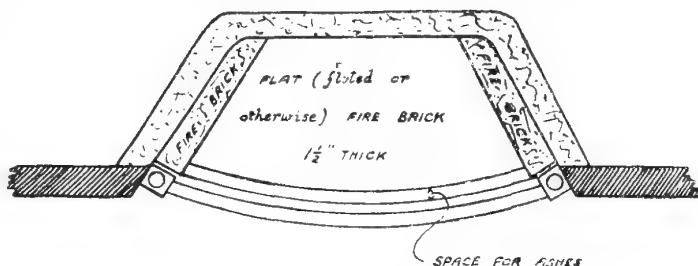


FIG. 3.—PLAN OF CONVERTED FIRE GRATE.

Incidentally a third point in favour of the idea might be mentioned, viz., the partial abolition of the hot and cold feeling one often experiences when sitting close to a good winter fire burning in an old pattern grate; front warm, back cold.

The idea can easily and cheaply be carried out by anyone at a small cost of a few shillings for each grate.



## A MEMORY OF THE PAST.

THE photograph here reproduced illustrates a type of instrument used in Sheffield some fifteen or sixteen years ago by the late Telephone Exchange and Electric Light Company, Limited. The microphone, designed by Mr. William Johnson, the manager and engineer of the Company, was very efficient for local service. It will be noticed a spoon receiver was used.

## INVENTORY OF PLANT.

The following additions have been made to previous lists:—

HEAD OFFICE STAFF.			
Macleod, J. D.	.. ..	Engineer and Electrician	.. .. Hamilton.
Moody, S.	.. ..	Local Manager	.. .. Luton.
Elliott, T.	.. ..	Chief Clerk	.. .. Galashiels.
TRAVELLING STAFF.—Enumerators.			
Duce, J. R.	.. ..	Contract Dept. Clerk	.. .. Bradford.
Bell, B. A.	.. ..	Instrument Inspector	.. .. Manchester.
Scott, J. B.	.. ..	Clerk	.. .. Metropolitan.
Wilson, W.	.. ..	Electrician's Clerk	.. .. Edinburgh.
Gwyer, J. H.	.. ..	Local Manager	.. .. Southampton.
Hewitt, A. W. C.	.. ..	Clerk	.. .. Manchester.
Rushforth, J. A.	.. ..	Chief Inspector	.. .. Chester.
Scott, G. R.	.. ..	Contract Department Clerk	.. .. Edinburgh.
Newton, W.	.. ..	Clerk	.. .. Newcastle.
Williams, O. A. J.	.. ..	Clerk (Superintendent's Office)	.. .. Bristol.
Myers, W. H.	.. ..	Exchange Inspector	.. .. Manchester.

The following names should be deleted from the lists previously given:—

TRAVELLING STAFF.			
Charge R.	.. ..	Clerk.	
Hart, W. J.	.. ..	Clerk.	
Dalziel, J. C.	.. ..	Clerk.	



## LONDON NOTES.

AN extensive scheme of reconstruction is at present being carried out at the Hotel Cecil. As part of the rearrangement, the hotel authorities have decided to bring their telephone equipment up to date. The Company has accordingly received an order for a private branch exchange with twenty lines to the exchange, and 532 extension stations. The work has to be completed by the beginning of March.

CONGRATULATIONS have been showered on Mr. G. H. Wilkinson, Exchange Manager, Hop, who was married recently. Mr. Wilkinson is well known to many of the staff, and has acted as M.C. at the Bank Exchange whist drives ever since these popular gatherings were instituted. The staff at Hop presented him with an *entree* dish in pewter, while several friends joined with the Metropolitan exchange managers in presenting him with a music-stool, pewter inkstand and ash tray.

THE police siege of the Sidney Street house in which the suspected Houndsditch murderers had taken refuge had its reflex action on the telephone records of the locality. At one call office in Sidney Street the day's takings equalled the amount ordinarily obtained in a week, while another in Mile End Road—close to the scene of operations—realised in the one day as much as it usually takes in three weeks. The traffic at the London Hospital private branch exchange was very heavy, and the call office at the hospital dealt with something like nine times the ordinary traffic. Avenue Exchange felt the strain most, and had to deal not only with numerous calls to the War Office, Scotland Yard, etc., but also a large number of enquiries from the public and distant exchanges. Between noon and 2 p.m. there was quite a slump in traffic at East Exchange, the usual callers no doubt finding the excitement outside more attractive than the routine of business.

IT was with very deep regret that the staff heard of the death of Mr. G. H. Welldon, formerly Assistant Exchange Manager, Holborn. Mr. Welldon only resigned from the service in December last to take up a position with the Marconi Wireless Telegraph Company. He was taken ill on Christmas Day with appendicitis and peritonitis, and died on the last day of the old year. Mr. Welldon was a young man of considerable promise, and his early death is much regretted by all who knew him. Holborn staff sent a wreath; one was also sent by Avenue, Hop and London Wall (at which exchanges he had worked), in conjunction with a few friends in the traffic office.

At the London Telephone Society meeting on Jan. 4 Mr. Harvey Smith, of the Metropolitan Engineer's Department, read a very interesting and instructive paper on "Mechanical Problems in Aerial Line Construction" to an appreciative audience. A striking feature of the paper was the original matter of which it was largely composed. The greater part of the paper was given up to a consideration of the proper factor of safety to allow for wires, suspenders, poles, stays, etc., and all the factors governing this subject were fully considered. Mr. Smith said the "factor of safety" would be better named "the factor of ignorance," and explained that the greater the knowledge of the points affecting the subject the smaller the factor of ignorance need be. A simple method for determining the factor on existing cable spans was explained. Mr. Smith, in addition to being a keen and clear-thinking engineer, is a clever caricaturist, and some time ago, after hearing the Engineer-in-Chief deliver a paper dealing with the theoretical equipment of the engineer, perpetrated a clever sketch in which several engineers with markedly protruding foreheads, are engaged in making calculations and measurements in the field during the progress of the erection of a route. Various mathematical instruments are in evidence, and one man is on his knees engaged in drawing a vector diagram with the object of ascertaining the position and strength of the stays required. One of the speakers during the discussion referred to this sketch, and asked how it was that when he saw line work in progress he never detected any signs of calculations or references to tables or formulae. Mr. Smith explained in replying to the discussion that the modern telephone engineer is so well trained that he is able to apply his theoretical knowledge to his work without showing evidences of it. Several members took part in the discussion, and a hope was expressed that Mr. Smith would be as successful this session as last in carrying off a prize. As Mr. Poole remarked, the information contained in the paper is far too valuable to be confined solely to the archives of the society, and should in due course be published broadcast by means of insertion in the TELEPHONE JOURNAL.

THE Metropolitan Staff Dinner has been fixed to take place in Frascati's Restaurant on March 9. The committee desire to secure a bumper house on the occasion of what is almost sure to be one of the last united functions of the "National" staff in London. It is to be hoped that the staff will not fail in their response, and that all will help to make the dinner a memorable one.

ANOTHER preliminary announcement is that of the North-East District annual smoking concert to be held at the London Tavern, Fenchurch Street, on Feb. 24. This concert is always a success; the entertainment is sure to be good, and the good fellowship of those who attend is invariably unfailing.

THE Chess Club had rather "hard lines" before Christmas, as owing to their inability to get their strongest players together at any one match they lost in six fixtures. This year matters have improved, the two matches played having resulted in a draw and a win respectively—the former against Admiralty H. and the latter against Board of Agriculture by six to four. The team in these two matches was composed of Messrs. F. G. Margerson, T. K. V. Coburn, G. Bean, A. O. Tame, R. P. Lowe, J. A. Gordon, F. E. Waters, R. H. Carter, C. Wilson and R. Aitken.

THERE was an attendance of 175 at the Operators' Society meeting on Jan. 11. The first paper was by Miss E. Clarke, Operator, Avenue Exchange, on "How a Good Service can be Given by a Magneto Exchange." Miss Clarke has only been eighteen months in the service, and she certainly does great credit to those under whose supervision she has been trained. Her paper would have been a creditable production for one with a much longer operating experience, and showed a very thorough grasp not only of an operator's duties and the switchboard equipment, but of the main differences between magneto and central battery working. Indeed, if one were to venture a word of criticism at all, it would be that the comparison between the two systems was somewhat accentuated, and the case for the magneto exchange thus less strongly advocated than the author of the paper intended. The second paper was by Mr. O. Robinson, Inspector, Paddington, on "The Call Office Attendant." As Mr. Robinson was at one time an attendant he was able to speak with knowledge and authority. Not only did he do so, but showed a sense of humour and an amount of originality which were quite refreshing. At first glance the subject does not seem attractive, and it was therefore a distinct triumph for Mr. Robinson that he succeeded in arousing the interest and appreciation of his audience. Here also one word of criticism may be permissible—it was rather a mistake to insist so strongly on power being given to the attendant to collect the fee after instead of before conversation. Several speakers in the discussion gave good reasons why this should not be done, and there was no adequate reply possible to their arguments. The general discussion was on the lines of the paper itself—good-humoured, enjoyable and interesting.

THE Hospital Sunday Fund collections amongst the Head Office and Metropolitan staffs reached the gratifying total of £750 10s. 5d. for 1910. This is £35 better than the preceding year, and an advance of £76 on 1908. The money is well spent, and hundreds of the staff receive benefits of various kinds through the fund.

WHEN the Atherton Pit disaster in Lancashire became known at Christmas, Mr. E. F. Gray circulated a subscription list in Salisbury House. Small amounts only were asked for, and it is a pleasure to report that as a result £3 10s. was sent to the relief fund.

THE draw for the first round of the Clav Challenge Cup (football) took place a few weeks ago. Unfortunately, W. and N.W., who had been drawn against City and Head Office respectively, scratched, which left the only game to be played Salisbury House v. North-East. The match came off at Hackney Marshes on Jan. 7, North-East being vanquished by six to one. South-East having obtained a bye in the first round will now play Head Office in the second; City in the same round will tackle the victors of Jan. 7. The second round will probably be decided about the end of February.

## GLASGOW NOTES.

THE arrangements for closing the Royal Exchange have started. On Dec. 31 last about 1,800 subscribers were transferred to the new Post Office City Exchange. To those who remember the installation of the Royal Exchange with its handsome canopy, the depletion of the exchange brings with it memories. It is a commentary on the progress of telephonic art that an exchange of this type which is giving such a satisfactory service should so shortly be relegated to the scrap heap. The remaining subscribers in Royal will later be transferred to the new Douglas and Bell Exchanges. The turnover of the 1,800 subscribers was satisfactorily accomplished, and the subscribers are settling down to the new conditions.

ANOTHER innovation on the part of the operating staff! The interest which accrued for the past year from the Operators' Saving Bank Fund has been expended to purchase toys for the Sick Children's Hospital and Eastpark Home for Infirmary Children.

THE National Telephone Operators' Society and Club held its fourth meeting of the session on Jan. 9 in the Masonic Halls, when Mr. G. Edward, Hillhead Exchange Manager, read a most interesting paper entitled "Essentials of Proficiency." The subject was dealt with in a very instructive manner, and the reader was accorded a hearty vote of thanks.

The social part of the evening passed with music, songs and dancing, and was thoroughly enjoyed by all present.

The punctuality prizes for this evening were won by Miss I. Barrie and Miss C. McKellar of City Exchange.

YET another of the clerical staff has joined the ranks of happy benedicks, the latest being Mr. J. Paterson, of the cash office. On Dec. 30 last he was presented by the staff with a handsome oak clock and side ornaments. Mr. Scott, Cost Clerk, made the presentation. Mr. Paterson suitably replied.

THE installation of the apparatus for the new Douglas Exchange has already commenced in the new building which has been erected. The Western Electric Company, who are the installers, are now hard at work, and the exchange should be ready for opening during May.

The staff of the Charing Exchange and friends held their annual dance in the Prince of Wales Halls on Dec. 22. About 45 couples were present and a most enjoyable evening spent.

WORK in Glasgow is very brisk at the present time; the improvement in trade after the protracted lock-out in the shipbuilding industry has brought to

our Contract Department an increase of orders both for National and Post Office services. A considerable number of subscribers on both administrations are adopting the private branch exchange principle, with all the advantages which are so well known to telephone men.

The fourth meeting of the National Telephone Society (Glasgow and West of Scotland Districts) was held in Professor Muir's lecture hall in the Technical College on Jan. 11. A full report of the meeting will be found in another column.

Mr. J. F. MURRAY, Stores Department, has been promoted to the position of Directory Clerk in succession to Mr. J. M. Hay, who has decided to emigrate, and will shortly leave for Toronto.

The Glasgow Corporation is again to the fore in telephone matters, the town council having convened a meeting of representatives of the various municipal bodies throughout the country with a view to bringing pressure to bear on the Post Office in connection with rates. The *£ s. d.* question unfortunately is receiving more consideration than that of improved service, and bearing in mind the large percentage of unremunerative work done by the Company, and inconvenience and delay caused to telephone subscribers through ineffective calls, the latter point is one which it must be the constant endeavour of telephone men to drive home.

A NEW No. 10 C.B. board is being installed at Clydebank, and it is expected will be ready for working by the end of February. As soon as this is accomplished the transfer of Post Office subscribers from the old Clydebank Exchange will proceed, and the new exchange will afterwards serve the district.

THE Traffic Department Benevolent Fund, which is a useful institution doing a great deal of good, have expended during the past year *£30 5s. 4d.*, and carry forward a balance of *£59 7s. 8d.*

## CORRESPONDENCE.

### "THE PSYCHOLOGY OF THE OFFICE."—AN APPRECIATION. TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REFERRING to Mr. J. F. Scott's paper, "The Psychology of the Office," which has appeared in your issues of December and January last, the Company having marked its approval of this paper by awarding it the first prize in the office section, any appreciation from myself may seem perhaps a little superfluous. Notwithstanding, I cannot refrain from saying that the paper has struck me as being so excellent in all ways, not only as regards the subject matter in itself, but from the literary point of view also, that it seems to me to rank amongst the very best contributions to the JOURNAL, and in saying this I feel I can only be expressing the view of very many other men particularly interested in office matters. Believing this to be the case, I think it may not be unwelcome to Mr. Scott to know the satisfaction which some of the ordinary staff have derived from the reading of his exceedingly interesting paper.

There is only one little point which struck me, on which I am inclined to slightly disagree with Mr. Scott, and that is the ideal attitude which he considers should be adopted by the employee when the question of additional duties has to be faced. I myself would never encourage too critical an attitude on the part of the subordinate, as within reason I think it so much better the latter should leave such matters as the scope of his duty, his suitability for it, etc., to the discretion of his chief. Any other attitude will, I think, be generally improper and almost always inexpedient.

This, however, is only a small point, and with the rest of the paper I am in cordial agreement, and I can but reiterate my admiration of it.

Head Office, Jan. 16.

P. H. C. PRENTICE.

### METHODS OF LOCATING AND REPAIRING FAULTS IN UNDERGROUND CABLES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I BEG to thank Mr. Elliott and Mr. Warnock for so kindly giving me the benefit of their experience on the above subject. Their information has been most helpful to me.

I was also most interested in the description given by Mr. Preston, of Bristol, in this month's JOURNAL, on "The Erection of Large Poles in Difficult Places." Personally I think these descriptions and exchange of ideas on doing work is most interesting all round.

Douglas, Jan. 17.

G. GILLMORE, District Manager.

### "THE TELEPHONE LOAD LINE."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the correspondence on the above subject in the December issue of the JOURNAL from Messrs. Noble and Coombs, and also to Mr. Toms' notes in the November issue, I have the following observations to make:—

Item 3.—It is my opinion that to take an elaborate record on a day which is not representative of the traffic is waste of time. I agree that it would be better to specify a particular week when the peg count should be taken, and to rely upon the exchange managers, who have local knowledge, to select a day in that week which is representative of the traffic. It is also agreed that it would never pay to take a peg count once a month at an exchange where there was no traffic development.

Item 4.—I agree that the peg count should be made as simple as possible, and that the operator's load figure should take into account what work is involved in dealing with, say, 100 valued calls in half an hour.

Item 6.—No intelligent person would adopt London figures and use them without investigation, especially when it was definitely stated that they were of a very general nature.

Item 7.—It is known in practice that a much higher load can be taken when the majority of calls are identical and when the time valuation (from an operating point of view) is small. The principle involved is well put in paragraph 4 of the Engineer-in-Chief's Circular No. T<sub>1</sub> on "Monitors." It is difficult to value the disadvantage an "A" operator experiences in consequence of this and to include it in the time valuation of calls.

Item 9.—Mr. Toms is quite right.

Item 16.—It is, as everyone connected with the practical work of a large exchange knows, sometimes more efficient to have uniformity than absolute efficiency.

Page 72, paragraph 2.—I agree that an operator will become more efficient in the course of time (until a certain limit is reached) and utilise more of her idle time. It is understood, of course, that the same standard of service is to be maintained.

With regard to the interesting point raised by Mr. Coombs, I am confident that the time valuation of calls quoted by me in table "B," p. 48, of the June issue of the JOURNAL, are as correct as it is possible to observe them as far as manual operating is concerned. The proper proportions of difficult and ineffective calls were included. Mr. Coombs compares London with Bristol and shows that whereas a London "A" operator only spends 70 per cent. of the hour in actual operating, a Bristol operator makes use of 87 per cent. of her time. In July last at Bristol the percentage of junction working was 6; at London Wall and Gerrard it was 75 and 72 respectively. The calls dealt with at Bristol were therefore, we will presume, of a fairly uniform character and of comparatively short duration. I think it is due to this that a Bristol operator can make use of a greater percentage of her time than a London operator can. A London operator is, in a sense, forced to be idle, so that she can render a certain standard of service on the calls she does deal with. This is due to the operating of calls which are not of uniform character and which vary considerably in duration. In addition, it is possible that an "A" operator in London may have to use a portion of her spare time in work not associated directly with actual operating to a greater extent than a Bristol operator has to do. When I said that "we must also know the actual time value of our unit, the local call," what I meant to convey was that the local call was not a uniform unit like, for example, a pound.

Dec. 31.

H. DEANE.

### "MESSAGES CONVEYED BY LIGHT."

AT the fourth meeting of the Glasgow and West of Scotland Telephone Society on Jan. 11 Professor Muir delivered a lecture entitled "Messages Conveyed by Light." Mr. C. J. Millar presided over a good attendance of members. The meeting was a decidedly new departure on the part of the society, the subject being a popular science one.

The Chairman, after expressing the pleasure of the society in having Professor Muir with them on that evening, introduced the lecturer, who referred to the various theories as to the nature of light. He pointed out that it was stated light still remained one of the many mysteries by which we were surrounded. It was a mysterious form of wave motion in the mysterious ether of space. In the propagation of light, electric and magnetic forces were concerned. Messages were conveyed by light just as they were conveyed by wireless telegraphy. Wireless telegraphy waves resembled large Atlantic rollers; light waves a tiny ripple in the ether of space. An interesting experiment was shown in which water ripples spreading out from a vibrating pencil point were projected on a screen, and the ring of ripples compared with the ring of light observed spreading out from the new star or "nova" discovered in 1901; and as indicating the speed with which light travelled and the distance of this star from the earth, the lecturer remarked that, although the light was travelling at the rate of 190,000 miles per second, the star in question had burned itself out about 100 years before its light reached the earth.

The reflection and refraction of water ripples were also compared with the reflection and refraction of a beam of light shown passing through a tank of fluorescent water. The action of a prism was then explained, and a continuous spectrum, a bright line spectrum and a black line spectrum were shown on a screen. These latter demonstrations proved most interesting. The Professor pointed out that light not only gave a convenient means of telling the constitution of various substances on the earth's surface, but enabled us to tell of what substance the sun was composed and also to judge of the nature of the stars. An explanation of colour was next given. Various colours were shown under ordinary electric light, and then by means of a mercury vapour lamp. In light, lacking red rays, the red colours became black, and on the blue rays being cut off by means of a screen the blue became black.

A most interesting account of the three-coloured theory of vision was then given, and it was shown by means of a spinning coloured top that red, green and blue produced the sensation white. The professor then dealt with colour photography, and projected a number of photographic slides on the screen showing that all colours could be produced by the suitable blending of red, green and blue. Finally, the condition known as "colour blindness" was referred to. By means of a green-blue screen the vision of a red-coloured blind eye was imitated, and it was shown how such an eye matched bright green with bright yellow, blue with pink and red with black.

On the conclusion of the lecture Professor Muir invited questions, to which he replied. On the call of the Chairman a very hearty vote of thanks was awarded the lecturer for his most able, instructive and interesting lecture.

## NEWS OF THE STAFF.

Mr. C. C. WORTE, District Manager, Hull, on the occasion of his transfer to Edinburgh, was presented by the members of the Hull staff with a smoker's cabinet.

Mr. W. A. COSSAR of the district office staff, Belfast, on the occasion of his leaving the service to go abroad, was presented with a travelling bag and rug by Mr. J. D. W. Stewart on behalf of the staff.

Mr. J. HAMMOND, Storekeeper, Pontypridd, was presented by the staff with a Gladstone bag and pipe on the occasion of his transfer to Plymouth.

Mr. R. S. EVANS, Pontypridd, was the recipient of a silver cigarette case, suitably inscribed, from the staff on his transfer to Exeter as Storekeeper.

Mr. J. B. ROUSE has been transferred from Chatham to Portsmouth as Storekeeper.

Miss ELIZABETH PATON, Operator, Argyle Exchange, Glasgow, left on Dec. 22 to go abroad. The staff in her exchange presented her with a dressing case.

Miss ALICE DUNBAR, Operator, Ibrox Exchange, left on Dec. 1 on account of ill-health.

Miss FANNY FRASER, Operator, Shettleston Exchange, left on Dec. 1 on account of ill-health.

Miss DAISY ISABELLA MACLACHLAN, Clerk-in-Charge, Burnley, has left the Company's service to take up an appointment in the teaching profession. The staff subscribed for a watch, which was presented to her by Mr. H. J. Callis, Local Manager.

Mr. H. SMYTHE (Storekeeper) was presented by the Portsmouth staff with a case of pipes and other presents on the occasion of his leaving the Company's service to go to Australia, where he is about to engage in farming.

Mr. C. COWARD (Inspector, Portsmouth), who accompanied him, was presented with a dressing case. Both had a hearty send-off, and carried the best wishes of the Portsmouth staff with them.

Mr. T. ELLIOT, Chief Clerk, Galashiels, on leaving for Head Office Inventory staff, was presented by the members of the staff with a travelling trunk and rug.

## METROPOLITAN STAFF CHANGES.

Mr. R. JOHNSTON, Foreman Joiner, Kensington, appointed Walking Foreman, Paddington.

Mr. A. FAULKNER, Clerk of Works, Engineer-in-Chief's staff, appointed Buildings Surveyor, Metropolitan district.

Mr. A. W. LEIGH, Call Office Attendant, Salisbury House, to be Engineer's Clerk, Battersea.

Mr. E. A. GILBERT, Clerk, divisional engineer's office, South-East, to be Local Engineer's Clerk, Streatham.

Mr. C. F. COWDRAY, Clerk in statistical office, Salisbury House, to be Clerk, divisional engineer's office, West.

Mr. J. B. SCOTT, Engineer's Clerk, Paddington, to Inventory staff.

Mr. H. OST, Assistant Engineer in Metropolitan engineer's office, to be Assistant Engineer, Paddington.

Mr. J. C. CREE, Engineer's Clerk, Streatham, to Metropolitan engineer's office, Salisbury House.

Mr. A. ANDREWS, Night Operator, North, to be Clerk in statistical office, Salisbury House.

Miss BERTHA JONES, Operator, Westminster, has been promoted to be Supervisor, Hammersmith. She was presented by her former colleagues on leaving Westminster with a gold brooch and silver hatpin.

On Miss ALICE CLEMENTS' transfer from Battersea to Gerrard she was presented with a gold signet ring by the Battersea operators.

Miss ELLEN POLLARD, on being transferred from Battersea to Gerrard Exchange, was presented with an oak and silver biscuit barrel.

Miss ADA FIELDER, who after ten years' service as an Operator at Battersea resigned to take up her residence abroad, was presented by her friends in the exchange with a gold signet ring and a portable writing case.

Miss ADA ROBERTS, Operator, East, on being promoted to be Supervisor at London Wall was presented by the staff with a gold pendant.

## MARRIAGES.

Miss EDITH ANNIE EVANS, Operator, Farnworth, left to be married on Jan. 5. She had completed fourteen years' service, and was presented with a Sheraton clock by the Bolton staff.

Miss GERTRUDE MASSEY, Operator, Horwich, left to be married on Jan. 12. She was presented with a silver hair brush and comb by the Bolton staff.

Miss ALICE ALLAN, Operator, Argyle Exchange, left on Dec. 22 to be married. She was presented with a dinner service and flower pot by the operators in her exchange.

Miss MARY WATSON, Operator, Darlington, resigned after six and a half years' service on Dec. 24 to be married. She was presented with an eight-day Vienna clock by the staff, with their best wishes for her future happiness. Miss Watson was highly esteemed by her colleagues, and will be greatly missed.

Mr. ALBERT J. READ, Assistant Exchange Inspector, Nottingham, was, on the occasion of his marriage, presented with a dinner and tea service by the operating and electrical staffs, and with knives and spoons by the night operating staff.

Mr. W. GRIERSON, Outstandings Clerk, district office, Leeds, was presented by his colleagues on the occasion of his marriage with a handsome oak timepiece as a recognition of the good wishes of the staff.

Mr. H. WATTHEY, Instrument Fitter, Nottingham Factory, was presented by his fellow-workmen in the Table Set Department with a tea service on the occasion of his marriage.

Miss NELLIE SLAUGHTER, Operator, East Exchange (London), on resigning to be married, was presented by the staff with an electro-plated tea service. Miss Slaughter is sailing for New Zealand, where the wedding will take place.

## OBITUARY.

We regret to announce the death, on Tuesday, Jan. 10, of Mr. JOSEPH WM. PRICE, Local Manager, Pontypridd, after a short illness.

Mr. Price, who was 38 years of age, joined the Company's service on April 23, 1900, as Wayleave Officer at Cardiff, and was appointed Local Manager, Pontypool, on July 19, 1901, and further promoted to a similar position at Pontypridd on April 18, 1902.

He was very popular with his staff, a painstaking and zealous officer, and the Company has sustained a great loss by his death.

The funeral took place on Saturday, Jan. 14, at Cefn Cemetery, near Merthyr, all grades of the staff at both Pontypridd and Merthyr being present. Mr. James (Engineer) and Mr. Marsh (Traffic Manager) also attended on behalf of the District Manager and Cardiff staff, together with a representative from Newport centre. Wreaths were sent by the Cardiff, Newport and Pontypridd staffs. The deceased leaves a wife and child, with whom much sympathy is felt.

We regret also to report the death of Foreman CORNELIUS O'LEARY, Cork, who died on Jan. 15 in the North Infirmary, Cork. The deceased was a very satisfactory workman, and was very popular with the staff. The different departments were represented at the funeral on Jan. 18, and the staff sent a wreath and a cross. Mr. O'Leary had been in failing health for some time, and his death at the early age of 31 years is very much regretted. He leaves a widow and three children.

We have also to record the death of Mr. THOMAS HENRY HORROCKS, Chief Foreman, Rochdale, and Caretaker of the Littleborough Exchange. On Christmas Eve he fell down the cellar steps while carrying coal to the switch-room and fractured the base of his skull. He never regained consciousness and died the following Monday. The funeral took place on Dec. 28. Floral tributes were sent by the Company's staff, who were represented at the funeral. Mr. Horrocks had been in the Company's service about 27 years, and for the last ten years was Chief Foreman at Rochdale.

We regret to announce the death, which took place on Jan. 16, of Miss A. S. DEMPSTER, who was for two years operator at Dalkeith Exchange. She had for a considerable time been in delicate health and resigned lately on that account.

## LOCAL TELEPHONE SOCIETIES.

**Bath.**—At the fourth meeting of this society on Jan. 4, before a large attendance, Mr. W. S. Griffiths (Assistant Engineer) gave an interesting paper on "Line Faults," illustrated by slides. The subsequent animated debate was shared by Messrs. Challis, Cole, England, Harding, Owen, Parnell and Thorn.

**Birmingham Operators.**—The fourth monthly meeting was held on Jan. 12, when Mr. C. W. Piggott read a paper on "Double Lamp Clear in Birmingham," and Miss Smith, Supervisor (Central), very ably took the chair. A short discussion followed, after which Mr. E. Williamson presented the prize money to the successful competitors at the previous meeting, who were as follows:—First, Miss G. O. Cook, "Hints on 'B' Operating"; second, Mr. J. Carter, "Subscribers and their Sorrows"; third, Miss I. Adams, "Telephone Progress."

**Birmingham.**—The fourth meeting was held on Jan. 6, when a paper was read by Mr. A. H. Tilt on "Photo-Telegraphy," Mr. W. H. Cope being in the chair. The paper dealt fully with the subject, and was illustrated by a number of slides showing diagrams and sketches. A very interesting discussion followed.

**Belfast.**—The opening meeting was held on Nov. 21 when Mr. J. D. W. Stewart gave an interesting address on "Central Battery Working," illustrated by lantern slides. Some very instructive diagrams were exhibited, together with a number of photographs of exchanges where central battery equipment is installed, and explained by the speaker.

The second meeting of the session was held on Jan. 16, Mr. J. D. W. Stewart presiding. Mr. Pulford gave a very interesting address, illustrated by diagrams, on the subject of "Auto Clearing." In the discussion that followed the various questions raised were replied to by the speaker in an able manner.

**Blackburn.**—The sixth session was opened on Jan. 6 Mr. Remington, president, being in the chair, when Mr. Brown, Contract Manager, read a short paper on "Co-operation." The paper was of a most interesting nature and the author was awarded a hearty vote of thanks. The party which numbered 60 including several operators, then adjourned to another room when refreshments were served. Afterwards a lengthy programme of songs and recitations was gone through.

**Bradford.**—Mr. R. J. Skelton, Chief Inspector, of Keighley, occupied the evening at the telephone society's meeting on Jan. 11, when he gave a very interesting and comprehensive paper on "Accumulators." The chair was occupied by Mr. H. B. Sutcliffe, and the meeting closed, after some discussion, with a hearty vote of thanks to Mr. Skelton for his entertaining paper.

**Brighton.** This society held a meeting on Jan. 2, when Mr. C. Hooper gave a lecture on "Power Plant," and dealt in a very interesting way with the various kinds of apparatus used in the power book. Messrs. Frost, Parsons, Hatton and Boardman took part in the subsequent discussion. Mr. F. J. Frost, Traffic Manager, presided.

A meeting of this society was held on Jan. 23, Mr. C. F. Moorhouse, District Manager, being in the chair. A very interesting lecture on "Telephony: Past and Present" was given by Mr. A. E. Cotterell, Assistant Provincial Superintendent. There was a good audience, and a considerable amount of interest was



shown in the subject. The lecture was illustrated with lantern slides, diagrams and blackboard drawings. A short discussion took place at the close.

**Bristol.**—At the fourth meeting of this society, Mr. T. C. Honeywell read his paper on "Stores and Storekeeping," dealing with the subject very comprehensively. Mr. E. L. Preston, the Engineer, presided, supported by the vice-president, Mr. J. T. Mayo Smith, and there was a very large attendance of the members, and also some visitors from the operators' society.

**Cardiff.**—The third meeting of the society was held on Jan. 12, Mr. S. F. Whetton being in the chair. There was a good attendance. A debate on "Departmental Co-operation" was opened by Mr. W. J. Marsh in a very able manner, and was followed by a most interesting discussion, in which most of the members present took part. The debate was closed by the chairman, Mr. Whetton. At the close of the meeting a vote of condolence and sympathy was passed with Mrs. Price in her sad bereavement on the loss of her husband, who was Local Manager at Pontypridd and one of the most popular members of the society.

**Cardiff Operators.**—The second meeting of the session was held on Dec. 13, and took the form of a competitive night. There were 31 members (50 per cent.) present, with vice presidents. The chair was taken by Mr. Williamson, Local Manager of Newport. Papers were given by six of the junior members, as follows:—"What I Think of the New Exchange," by Miss W. M. Davies; "How Enthusiasm Helps an Operator," by Miss M. Davies; "Are the Society Meetings Beneficial," by Miss D. F. Lyons; "Private Branch Exchanges," by Miss A. L. Kuhlke; "Importance of Tone and Manner," by Miss M. Smiles; "Advantages of C.B. over Magneto System," by Miss A. E. James. The vice-presidents, together with the clerk-in-charge and supervisors, adjudicated and awarded the first prize to Miss Lyons, the second prize to Miss Kuhlke, and the third prize to Miss James. All papers were exceptionally good, and a most pleasant and profitable evening was spent.

**Douglas.**—The seventh meeting was held on Dec. 23. The District Manager presided. A most interesting and instructive paper was read by Mr. Kelly, Chief Clerk, on "Points in Office Work." He showed most clearly the points in which the staff should be most careful in booking material and time, so as to bring all work under its proper heading.

The eighth meeting was held on Jan. 6, the District Manager presiding, and after giving some good advice for the new year, he introduced Instrument Inspector Cain, who by the aid of diagrams and some very instructive experiments gave a most interesting description of the action taking place in the various forms of batteries used in the service.

The ninth meeting was held on Jan. 20. The District Manager presided, and called attention to the great importance of the staff learning all possible about underground work, which was the coming system. A paper was read by Instrument Inspector E. Vick on "Joining Underground Cables," which was most interesting, and illustrated by diagrams, specimens of joints and joint making.

**Dover.**—The fourth meeting for the session was held on Jan. 13. Mr. W. F. Taylor, Divisional Officer of the Inventory staff, kindly consented to occupy the chair. Mr. C. G. Barker, of the Engineer-in-Chief's Department, gave an excellent paper on "Economics of Transmission." His remarks, although of a very technical nature, were keenly followed, and various questions arising on the subject were dealt with at the close of the lecture.

**Edinburgh.**—The third meeting of session 1910-11 was held on Jan. 9. Mr. Wrote (District Manager), the newly elected president in succession to the late Mr. Gilmour, presided. Mr. J. S. Smith, A.I.E.E., of the Post Office, delivered a lecture entitled "Some Notable Inventions." The lecture dealt with the pioneers of telephony and the disputed claims of rival inventors. Reference was also made to the discovery of the electric clock, Edison phonograph and wire less telegraphy. Remarks were made and questions asked by several members, to which the lecturer replied.

**Exeter.**—A paper was given on Jan. 3 by Mr. J. Southwell, Contract Officer, entitled "From my Point of View." It was an interesting and original paper, well appreciated and brought forth a deal of discussion.

A paper was given on Jan. 17 by Mr. W. Robnett, Chief Inspector, Torquay, entitled "Testing Equipment." The exhibition and explanation of the different patterns of testing apparatus made the lecture an extremely interesting one, many points being raised regarding the advantages and disadvantages of the various apparatus.

**Gloucester.**—The third meeting of the session was held on Jan. 11, Mr. F. W. Seats, Engineer, being in the chair. A very good paper was given by Mr. A. Berry, Inspector-in-Charge, Lydney, on "Maintenance and Faults," including several interesting features in connection with the Lydney area. Profitable discussion followed, in which Mr. J. L. de Medewe, Mr. Greenland, Mr. Savory and others took part.

**Huddersfield.**—The Local Manager, Mr. G. Wicker, on Jan. 12 gave an interesting address to about 50 members of his staff, the subject being "Switch-board Maintenance." By means of diagrams and apparatus excellent illustrations were given on both the theoretical and mechanical aspect of the telephone practice. The Contract Manager, Mr. T. W. Jowett (West Yorkshire district), presided.

**Leeds.**—At a meeting held on Jan. 11, Mr. J. H. Corlett read a paper designated "Contract." After the ensuing discussion Mr. T. Parker read his paper on "The Maintenance of Inside Plant." The discussion on this was an animated one, some thirteen members taking part. The attendance was below that of the previous meetings.

**Leicester.**—A meeting of the society was held on Jan. 12 at the Foresters' Institute, Mr. M. Marsden occupied the chair, and the speakers for the evening were Messrs. H. Flint and E. Rendell. Mr. Flint read a very interesting paper on "Sound in its Relation and Speech," and by the aid of diagrams clearly expounded the theories of the subject. Mr. E. Rendell's paper on "Spare Plant" was well received.

**Liverpool and Birkenhead Operators.** The third meeting of the session was held on Dec. 13. Mr. H. A. Hincks occupying the chair. Two papers on the subject of "Mixed Rates" were read by Miss G. Martin and Mr. T. W. Wickham respectively. Miss G. Martin took a broad view of the matter, chiefly from an operator's standpoint. In Mr. Wickham's paper the arguments for mixing the services and the purposes of distribution were clearly set out, to which Mr. Francis (Traffic Manager) added some remarks explaining the position by reference to curves based on the traffic through the Liverpool Central Exchange. As usual the meeting was very agreeably concluded with a short musical programme.

The fourth meeting of the session was held on Jan. 10, Mr. Francis, Traffic Manager, presiding, when Mr. R. J. Edwards, Exchange Manager, read a paper entitled "The Evolution of a Telephone Operator." The paper described in a very interesting manner the various stages of an operator's training and career leading to the positions of supervisor and monitor, and, by reference to the duties of each, the unity of the *personnel* of a telephone exchange was carefully worked out. An interesting discussion ensued, in which Mr. Shepherd, Provincial Superintendent, contributed some very interesting information regarding "primeval" telephony and the operators of the period. The meeting was concluded with a very enjoyable musical programme, kindly provided by Mr. Woodward (solo pianist) and the Bohemian Quartette.

**Luton.**—Miss A. Stone, Travelling Supervisor, read on Dec. 12 a paper on "Operating." Miss Stone dealt with the subject very ably, and the operators, of whom there was a good number present, were able on this occasion to hold their own in the matter of questioning the lecturer.

On Jan. 16 Mr. J. S. Best, Acting Local Manager at Bedford, gave a paper entitled "Underground Work." Some very good lantern slides were shown, illustrating the construction of underground in several parts of the country. A notable feature in this, as well as in the three previous meetings held this session, was the remarkable good attendance.

**Manchester.**—The fourth meeting of the session was held on Jan. 6, when a paper was read by Mr. A. Chapman on "Notes from a Service Inspector's Note Book." Mr. Chapman dealt with the troubles experienced by subscribers owing to their not using the instruments in a proper manner. Mr. Chapman quoted a number of anecdotes from actual experience during the course of a paper which was very interesting and of a very humorous nature, and which was followed by a very interesting discussion.

**Newcastle.**—The third meeting of the session was held on Dec. 19 before a moderate attendance. A paper on "Phases of the Measured Rate Service" was read by Mr. J. P. Urwin giving a thorough explanation of the different rates in force in the district. The paper was much discussed, Mr. Urwin answering the various points raised to the satisfaction of those present. A second paper on "Wireless Telephony," which was to be read by Mr. M. T. Byrne, was unable to be given owing to that gentleman's indisposition.

The fourth meeting was held on Jan. 9 before a good attendance, the hon. president (Mr. A. Drummond) occupying the chair. An excellent paper on "Telephone Investigation Work" was read by Mr. B. S. Cohen, of the Engineer-in-Chief's staff, dealing with various phases of the Company's work, including transmission, testing of telephone apparatus, loadings of circuits, etc. The paper was thoroughly enjoyed, the points covered by the paper being fully discussed and the numerous questions asked answered by Mr. Cohen in a manner satisfactory to all.

**North-Eastern (London).**—A meeting was held on Jan. 4, Mr. G. J. Gadsby being in the chair. Mr. H. S. Peck, the president, travelled up specially from Birmingham to read a paper entitled "Inventory Work," in the course of which he explained the constitution and methods of the inventory staff, the various forms and books used, and how the information concerning the plant is collected and tabulated by the various staffs. After the paper a number of splendid slides of Bristol, Bath, etc., were shown (kindly lent by Mr. Perkins, District Manager, Bristol, and Mr. Barr, of the Inventory staff), to whom the thanks of the society are due.

**Nottingham.**—The second meeting of the session was held on Dec. 30. The chair was taken by Mr. C. H. Sibley, vice-president, and the minutes read and confirmed. An interesting letter was read from a former inspector on the Nottingham staff, Mr. D. S. Clayton, who is now engaged in telephone work at Calcutta. Papers were read by Misses Green and Brooke on "Operating." Miss Green's remarks were principally relative to order wire working, and Miss Brooke's paper to call offices. A number of slides, which had been obtained from Head Office, were shown, giving views of various switchrooms, boards, etc. Subsequent discussion was general, seventeen members taking part. Mr. Sibley offered a prize for the better paper, and awarded it to Miss Brooke. It will be presented at next meeting.

**Oldham.**—On Nov. 24 a very interesting paper was read by the District Manager, Mr. A. Pugh, on the subject of "Expenditure," with special regard to wastage charges. The paper created a large amount of interesting discussion, and many points raised during the same were ably explained by the lecturer. In the absence of the president, Mr. A. Spargo (employed on the Inventory staff) the chair was taken by Mr. George Hey (Contract Manager).

**Portsmouth.**—On Jan. 11 a paper was read before the telephone society by Mr. S. J. Pharo, Traffic Manager, on "Sub-Exchange Traffic." The lecture was well attended in spite of inclement weather, and a good discussion ensued afterwards, in which Mr. Morice, Mr. Lockwood, Mr. Yates and Mr. Parsons took part. The chair was taken by Mr. L. F. Morice, Engineer.

**Plymouth.**—On Dec. 22 two very good papers were given as follows:—"Storekeeping," by Mr. S. G. Tregillus; and "Faults," by Mr. J. Hammond. Useful hints were made in both these papers, which were followed by a discussion. The president, Mr. R. A. Dalzell, was in the chair on this occasion.

On Jan. 4 two papers were given as follows:—"Some Phases of Operating and Supervision," by Miss E. D. Davis; "The Telephone Inspector and his Relation to Commerce," by Mr. F. Knight. These papers were very interesting

and brought out some useful discussion. The chair was occupied by Mr. D. J. Meikleham.

**Sheffield.**—The third meeting was held on Dec. 23, the chair being taken by Mr. C. Marsden (Assistant Engineer). A paper was read by Mr. E. S. Byng (London), entitled, "Economics of Line Construction." The paper was divided up under various heads, each of which was dealt with in a clear and direct manner. A discussion took place at the close of the meeting, in which members of the Inventory staff, stationed in Sheffield, took part. Mr. Watts (Head Office) was also present and took part in the discussion.

**Southampton.**—An operators' society has been formed here, the first meeting of the session taking place at the Grosvenor Café on Nov. 28, when an interesting and valuable paper on the "Manipulation of Telephone Traffic" was given by Mr. Sydney O. Allen, the Traffic Manager. The chair was taken by Mr. W. Howe, the District Manager. The meeting was an open one, and was attended by all sections of the staff, and an animated discussion followed. The close of the business meeting was followed by an enjoyable social evening, the attendance of which included some 70 members of the staff.

The second meeting of the session was held on Dec. 15, three papers being given by Misses Smith, Haynes and Starkey, Supervisors, Southampton, the subjects covering operating, team work, ticket recording, junction working and sub-exchange supervising. Over 70 per cent. of the members of the society were present, and over 60 per cent. entered into the debate. The chair was taken by Mr. S. O. Allen, the Traffic Manager.

**Southern (London).** A meeting of the above took place on Jan. 9, when Mr. F. Grove occupied the chair, and a paper was read by Mr. J. H. Pattman, entitled, "The Electrophone of To-day." The paper deserved much better support than a small audience, which included as visitors Miss Newman (Hop), Messrs. G. F. Greenham and F. G. C. Baldwin, and several members of the operating staff, to which an invitation had been extended. Messrs. Greenham and Baldwin both criticised the paper, but Mr. Pattman had, by his lucid and full description of the methods in vogue, apparently answered the majority of the questions before they were put.

**Swansea.**—The third sessional meeting was held on Dec. 21, Mr. W. E. Gauntlett (District Manager) occupying the chair, when a general debate on various questions relative to the telephone service constituted the evening's programme. Mr. A. L. Stanton (Acting Electrician) took a prominent part in the discussion, considerable information being given by him on the points raised in connection with the technical branches. All departments were represented by the speakers, amongst whom were also included Messrs. W. J. Hodgkiss (Engineer), W. Bevan and E. Harris (Linemen Inspectors).

The fourth sessional meeting took place on Jan. 18, when an excellent paper was given by Mr. W. Caine (Foreman Faultsman), entitled "Faults and their Causes." The subject was dealt with in a very able manner, some valuable points in connection with line maintenance and the steps necessary to reduce the number and duration of faults being emphasised. A good general discussion followed, in which a large number of those present participated.

**Swansea Operators.**—The fourth sessional meeting was held on Jan. 11, Mr. W. E. Gauntlett (District Manager) occupying the chair, when excellent papers were contributed by Misses E. J. Davies, N. Thomas and W. Rowland (Operators, Swansea). The papers, which dealt with various questions pertaining to operating, were extremely well written, and a good general discussion followed each. Mr. W. E. Gauntlett afterwards provided an enjoyable half-hour with a description of some of "Picturesque Italy's Scenery" illustrated by lantern slides.

**Western (London).**—The third ordinary meeting of the session was held at Gerrard Exchange on Jan. 4, when Mr. C. Huttlestone read a paper entitled "Sound Physics," and illustrated it with lantern slides and practical experiments. The lecture proved very interesting, and a hearty vote of thanks was accorded Mr. Huttlestone at the conclusion of the reading.

**Weymouth.**—The first meeting of the session was held on Nov. 24, the lecturer being Mr. Hunt, a prominent local electrician; the chair was taken by the Local Manager, Mr. J. A. Attwooll. Mr. Hunt gave an instructive address, supplementing it by various electrical experiments with actual models, including wireless telegraph apparatus.

**Wolverhampton.**—The North Midland Telephone Society have had promises of papers towards the present session's syllabus as follows:—Mr. W. Bentley, "Curve Plotting and the Slide Rule"; Mr. W. Dalton, "Transmitters and Transmission"; Mr. R. W. Lloyd, "Radio Telegraphy"; Mr. C. W. Piggott, "Past and Present" (lantern lecture); Mr. G. Taylor, "Combustion Engines" (lantern lecture); Mr. H. G. Watkin, "Wireless Telegraphy and X Rays."

## CHRISTMAS TREATS TO POOR CHILDREN BY OPERATORS.

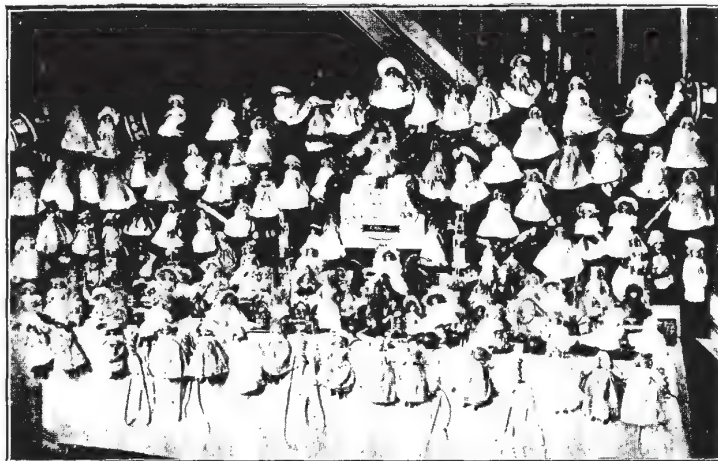
**Manchester.**—The operating staff at the Central Exchange held their sixth annual doll show on Dec. 20 and 21 last, and their efforts were most successful. Some 200 dolls, together with a similar number of toys, both mechanical and instructive and suitable for children ranging in age from twelve years to one year, were on exhibition.

It is worthy of note that the dressing of the dolls was done by the operators themselves, and the artistic taste displayed reflects great credit on the artists in addition to proving that operating alone is not their sole education.

The patronage given by the male staff to this annual event was most generous, thus making it the most attractive yet held.

The show was visited by the Provincial Superintendent and the District Manager and a large number of the relatives and friends of the staff.

The dolls and toys were afterwards sent to the Charter Street Ragged School and Pendlebury Hospital for distribution. *Expedi Hercules.*



MANCHESTER CENTRAL EXCHANGE DOLL SHOW.

The Manchester City Exchange have inaugurated a doll show on similar lines to the Central Exchange and with the same objects. Our illustration depicts the show which was held at the City Exchange, and it may be mentioned in passing that the female staff of the Manchester district office also joined with the City Exchange operators, in the provision and dressing of the dolls.



MANCHESTER CITY EXCHANGE DOLL SHOW.

**Sheffield.**—It is usually the busiest people in this world who find most time to spare to help others who are not so well provided for as themselves, and to whom the nature of a treat of whatever form it may take is practically a great rarity.

This is exemplified by the Sheffield operators who, supported by the rest of the staff, some months prior to Christmas employed their spare time during relief and in the evenings dressing dolls with which they intended to decorate a Christmas tree for the most needy children in the city.

When their operations were completed they found from Mr. Holmes (the Police Court Missionary) that St. Simon's children, numbering 200, ages from three to seven, would not only be grateful for the gifts, but also that a Christmas tree had never before come their way.

The tree stood over 9 feet high and, symbolical of the season, on the gift was poised a fairy with silver wand on the top. There were over 120 dolls in about 120 styles of dress, every one of them up to date even to some in hobble skirts, besides hosts of toys, which gladdened the hearts of the youngsters.

The concert arranged by the operators and the distribution of the gifts was, as may be supposed, a great success, and the occasion will long remain in the memory of those who took part, the operators feeling that their toil had been well repaid by the delight and jubilation of the recipients.

All arrangements in connection with the tree and concert were supervised by the Chief Operator, Miss Ibbotson, who dealt with the matter in her usual whole-hearted fashion, and also occupied the unique position of acting as Father Christmas, each child receiving a toy, a bag of sweets and a bun.



### STAFF GATHERINGS AND SPORTS.

**Paisley.** The second meeting of the telephone society was devoted to social entertainment, which took the form of a whist drive. The game was thoroughly enjoyed by a large turn-out of members.

**Greenock.**—A successful whist drive was held on Dec. 29 in connection with the telephone society, and a party of 32 spent a most enjoyable evening. The prizes were presented by Mrs. A. Ramsay Lamb to the winners. Miss Haig, Operator, won the first prize for ladies, and Mr. A. Ramsay Lamb, District Manager, won the first prize for gentlemen.

**Oldham.**—A football match, under Association rules, was played on Jan. 14 between the members of the Oldham staff and of the Manchester staff. The match was contested at Oldham before an interested number of spectators, and resulted in a close victory for the Oldham team by one goal to *nil*. One or two members of the Oldham team were conspicuous in their efforts, and the game was controlled by Mr. W. B. Cheerham, Oldham, who acted in the capacity of referee. Both teams were well kept in hand. After the match the Oldham staff entertained the visitors to a substantial tea and concert at the Oriental Cafe, which was thoroughly enjoyed by all who took part. Arrangements for the whole gathering were carried out by Mr. Higson.

**Swansea.**—On Jan. 14, at the Mackworth Hotel, Swansea, a large number of the Swansea district staff were present as guests at a dinner and smoking concert given by the Swansea section of the Engineering Department of the Post Office. The company numbered about 120, and included, in addition to Mr. W. Pennington (Sectional Engineer, P.O.) and Mr. L. Jones (Postmaster, Swansea), Mr. W. E. Gauntlett (District Manager) and Mr. W. J. Hodgetts (Engineer) of the Company's staff. As was to be expected, reference was made by almost all the speakers to the fast approaching transfer, and Mr. Gauntlett, in responding to the toast of "The Visitors," expressed the hope that the staff of the Post Office would, on Jan. 1, 1912, receive as comrades the National Telephone Company's staff, who could be relied upon to serve the State as loyally as the Company had hitherto been served. The musical items which followed were rendered in excellent style, and the function was voted by the Swansea staff a signal success both from a social and from an *entente* point of view.

**Edinburgh.** The second whist drive of the season was held on Jan. 13, the company numbering 48. The prizes, consisting of a trinket-box and whist-markers, were presented by Mrs. Robertson, wife of the Chief Electrician, the winners being Miss M. Ross, Supervisor, and Mr. W. Chandler, Sub-Engineer. It is worthy of note that Mr. C. C. Wote, District Manager, tied with Mr. Chandler, and it was only after an extra hand had been played that the latter was declared winner. Mr. D. C. Heggie, Stores, was awarded the booby prize.

**Plymouth.**—On Dec. 23 a social evening was spent by the Plymouth operating staff in their dining room, which was decorated for the occasion. Numerous games were arranged, and gramophone selections added to the enjoyment of the evening. The gathering was very successful. The arrangements were made by Miss E. Westlake, Clerk-in-Charge, assisted by Miss D. Davy, Supervisor.

**Manchester.**—Under the auspices of the Manchester National Telephone Swimming Club a very successful whist drive was held on Jan. 16 at the Warehousemen and Clerks' Cafe, Manchester. In all 160 were present, principally members of the staff. The prize winners were as follows:—Ladies: First (gold pendant), Miss Peacock; second (dressing case), Miss E. Robinson; hidden table prize (scent spray), Miss Frost. Gentlemen: First (silver cigarette case), Mr. Knowles; second (umbrella), Mr. Brooks; hidden

table prize (box of cigars), Mr. Deaville. Mr. A. C. Godfrey acted as M.C., and altogether a very enjoyable evening was spent.

**Leicester.** Mr. J. N. Lowe, Local Manager, is to be congratulated on his success in the golf handicap recently held at Leicester for the "Corah" cup. The final was unfortunately contested in very bad weather, and although Mr. Lowe did not win the cup he made a very deserving attempt, and was awarded the second prize.



OVERHEAD AND UNDER-GROUND ENUMERATORS,  
A AND C DIVISIONS.

### THE INVENTORY STAFF.



DIVISIONAL AND SECTIONAL OFFICERS OF THE A AND C DIVISIONS AT  
BRISTOL.



INVENTORY STAFF: A AND C DIVISIONS, BRISTOL.



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## TELEPHONE MEN.

### LVIII.—ALAN ROBERTS.

ALAN ROBERTS was born in Liverpool on Aug. 16, 1867, and educated at St. Mary's School, Edge Hill. Being one of a very large family it was necessary for him to enter business earlier than most boys, but this fortunately, as after events proved, was not detrimental to his future success.

His entry into commercial life was found in the Lancashire Telephone Company under Mr. R. H. Claxton, but there was not much for him to do there as a boy in those days, and Mr. Claxton soon found him employment in a firm of Liverpool cotton brokers with whom he received a valuable commercial education. After a few years this firm closed their Liverpool house, and Mr. Roberts, who had in the meantime made himself proficient in shorthand, was on Jan. 5, 1885, again taken into the telephone service by Mr. Claxton.

By the time of the amalgamation of the Lancashire and Cheshire Telephone Company, Limited, with the National in 1889, Mr. Roberts had passed through and had charge of most of the Clerical Departments. He was then appointed Head Bookkeeper and took instructions from Mr. Chambers, the present Northern Provincial Superintendent, as to the compilation of the National Company's returns which had to be got out for the past three months without delay.

Leaving old methods with some diffidence, he entered on this new departure, and by almost continuous day and night work he completed the work in a satisfactory manner.

Part of Mr. Roberts' duties at that time was to check and examine all electrical and engineering estimates, which gave him an insight into the technical part of the business. This he found very fascinating, and followed it up by attending evening technical classes. At the same

time he found the Liverpool staff very ready to assist him in this direction.

In September, 1895, Mr. Roberts was appointed Chief Clerk, a position he held until Jan. 1, 1903, when he was appointed Local

Manager for the Northern division of Liverpool, with local offices at Bootle.

It was immediately after this that he suggested to the Engineer-in-Chief the method now adopted for ventilating call office cabinets.

Finding plenty of technical work in his new sphere of labour and much to interest him in underground construction and reconstruction, the opening of new exchanges and the reconstruction of exchanges, he assiduously applied himself to these questions, and continuing his evening studies soon had a real grasp of the engineering side of the business.

Crosby Exchange was the first common battery exchange opened in the Liverpool district. During its construction Mr. Roberts followed the work in close detail, and the change-over from magneto, though attended with considerable difficulty owing to the scarcity of spare underground circuits, was successfully carried out.

On the amalgamation of the Liverpool and Birkenhead districts in July, 1909, Mr. Roberts was appointed Chief Electrician, and during the succeeding twelve months had a very busy time reorganising the department and in carrying out the work in connection with the successful opening of four new common battery exchanges—Bank, Bootle, Anfield and Wavertree.

In September, 1909, he was appointed Lecturer on Telephony at the Central Technical School, Liverpool, but was obliged to cancel his appointment for 1910, as his services were required on the "Inventory" staff as a Divisional Officer.



Further promotion awaited Mr. Roberts in December, 1910, when he was appointed District Manager for Middlesbrough. His duties on the Inventory staff have not yet permitted him, however, to take up his position in that town.

The whole of Mr. Roberts' long telephone experience has been obtained in Liverpool (a splendid training school for any telephone man), where the changes in managership have been few—viz., Mr. R. H. Claxton, Mr. Arthur Martin and Mr. E. J. Hidden, and with which he has many old and happy associations.

Mr. Roberts is well-known to his many friends as a man of almost unbounded energy, happy optimism, and much self-confidence; all qualities which, aided by continual hard work, have enabled him by his own efforts to rise from Office boy to District Manager with a most useful intervening experience in both the commercial and technical branches of the telephone business.

Whilst a strict disciplinarian, he is just and handles his staff well. As indicating the esteem in which he is held by the Liverpool staff he has just been presented by them with a fine "Cutler" roll-top desk and Mrs. Roberts with a gold bracelet.

Among Mr. Roberts' recreations may be classed singing, and he was thirteen years solo bass at Christ Church, Liverpool. He was a keen Rugby football player in his younger days, but has now taken to bowls and golf. Walking also has always been one of his favourite pursuits.

### BRUIN AND THE TELEPHONE POLE.

*The humming of the wires led the bears to believe that the poles were the headquarters of bees, and they pursued that enticing goal. Their longing for honey gave rise to fresh destruction. But the shaggy dwellers in the forest learned by their disappointment: the number of attacks on lines decreased more and more, and eventually the humming of the wires lost its attractive power for Bruin.—Zeitschrift für Post und Telegraphie.*

In the dark Norwegian forests  
Snug beneath the pine trees couching  
Slept the bear, the honey hunter,  
Slept and slumbered through the winter.  
O'er his dreams a sound came stealing,  
Louder now and now retreating,  
Like the humming of the wild bees.  
And he dreamt of feasts of honey—  
Feasts of wild and luscious honey—  
Woke and started from his couching,  
Started out to find the humming  
Which came faintly on his senses,  
Through the pine trees still appealing.  
Stiffly moved he through the forest,  
Still with sleep his limbs were heavy,  
And the snow lay thickly round him,  
Blinded was he by his dreaming,  
Never once thought of the season,  
Never thought that it was early,  
Very early for the wild bees.  
Lunged and lumbered through the forest,  
Till he came where rose a pine tree,  
Straight and bare it rose up stiffly,  
And it seemed the wild bee humming  
From the topmost branch was coming.  
So he climbed with pain and groaning,  
Often slipping, often moaning,  
Gained the top and reached out blindly,  
Searching for the magic honey.  
But no honey did he find there,  
Only china insulators—  
Cold white china insulators.  
Got all tangled in the wiring,  
Slipped and fell and broke the wiring,  
Came to earth a sadder Bruin.  
Slowly to his couch repairing,  
Thought he sadly, thought in this wise,  
"Though the humming goes on coming,  
"I shall know 'tis only mumming,  
"And the bees that make the drumming,  
"Bees that sting but make no honey."  
And the gang who came to mend it  
Murmured sadly "Drat the bear."—E. M. BUCKLAND.

### A "TELEPHONE AUTHORITY" FOR GREAT BRITAIN.

At a meeting of the London Chamber of Commerce, held at Oxford Court, Cannon Street, London, on Feb. 17, 1911, Mr. Herbert Laws Webb, M.I.E.E., gave the following address (Lord Desborough, K.C.V.O., the president of the council, was in the chair):—

A short time ago a young lady acquaintance of mine advanced the theory that silk petticoats and silk stockings should be supplied gratuitously to young women by the State. Her argument was that the wearing of these articles of apparel made young women feel so "nice" that the result would be for the general good of the community. This is an illustration of how far the modern feeling of reliance upon the State for all sorts of benefits has extended. At the present time the State is expending approximately a million a year in providing business men and the racing community with telegrams at under cost price. If my young lady friend had known this she would have been greatly fortified in her argument. It is well known that the principal users of the telegraph service are business people and that section of the community which attends horse races or bets on horse races. It is also generally known that the telegraph service is conducted at a large annual loss, but it is not so well known how this state of affairs has arisen, and I purpose now to trace briefly the history of the Government telegraph monopoly, which has had such a disastrous effect on the telephone industry of the country.

It has come to be regarded as a natural thing—a sort of divine right—that the telegraphs of a country should be a Government monopoly, but there is no real reason for this. All the pioneer work in telegraphy was done by private enterprise, the submarine cable service of the world is operated—and operated at very high efficiency—by private enterprise, and the telegraphs of North America, both of the United States and of Canada, are operated by private enterprise and apparently with satisfactory results to the public. In many continental countries, where the Government is extremely centralised and the local government really depends on headquarters, the telegraphs are an important part of the political machine and the public telegraph service is, so to speak, a by-product—and often a by-product of very inferior quality. These conditions do not apply in this free country, where there is no necessity for the Government to control the telegraphs in order to communicate with governors of provinces or prefects. There has never been a suggestion that Government control of the telegraphs here was a political necessity, and the present State telegraph monopoly was set up 40 years ago as a business proposition; and it is as a business proposition that it should be judged, both because it is just that the users of the telegraph service should pay a proper price for the facilities and because such an important electrical industry should be worked under sound financial conditions.

The State telegraph monopoly had its origin in 1865, when the late Mr. Frank Ives Scudamore, then a Second Secretary of the Post Office, was directed to report whether in his opinion "the Electric Telegraph Service might be beneficially worked by the Post Office, whether, if so worked it would possess any advantages over a system worked by private companies, and whether it would entail any very large expenditure on the Department beyond the purchase of existing rights."

Mr. Scudamore was an enthusiast but not a business man, and his report was strongly in favour of the acquisition of the telegraphs by the State, and he prepared estimates to show that the telegraph service in the hands of the State would be what the City would call a safe business proposition. The language of the reference is somewhat vague, as it is difficult to say what is meant by whether the State control of the telegraphs would entail "any very large expenditure" on the Department beyond the purchase of existing rights. Mr. Scudamore, however, allayed all misgivings on this point and convinced the Select Committees which inquired into the matter that profit and not "large expenditure" would result. As a matter of fact, the result has been a total expenditure up to date, for capital expended and unextinguished, for loss of interest and for excess of working expenditure over receipts, of approximately £35,000,000. The asset against this is the telegraph system of the Post Office as it exists to-day, but, as already noted, the system is being worked at a large and increasing annual loss.

If you will glance at the tables you will find there summarised the progress of the State telegraph monopoly on the financial side. Mr. Scudamore's first estimate was that the properties of the six telegraph companies then existing could be acquired for two and a half millions and worked at a sufficient margin of profit to provide interest on the money and sinking fund for extinguishing the capital. The second estimate, made two years later, brought the capital required up to £3,100,000, but still showed sufficient margin of profit to meet interest and sinking fund, as a net revenue of nearly 6 per cent. was calculated. The two committees of Parliament which sat on the Telegraph Bills that were based on Mr. Scudamore's report and estimates asked many questions on the financial features of the scheme, and it is evident throughout the proceedings that the scheme was treated as a business proposal and that there was complete confidence that under State management the telegraphs would not only pay their way but would yield sufficient profit to enable the capital to be rapidly extinguished by a sinking fund. The various tables show how completely these expectations were falsified in actual practice, but they also show how little practical investigation the original estimates received. It will be seen that the estimate of capital cost was first two and a half millions, then £3,100,000, and was a short time later raised to six millions, which became seven millions by the time the Telegraph Act of 1869 was voted. The reason for the rapid increase of estimated capital expenditure from three millions to six millions was that Mr. Scudamore found when he came to close quarters with the telegraph companies that their properties were worth much more than he had estimated in the seclusion of his office at

St. Martin's le Grand. The bearing of this increase in the capital expenditure is seen in table 2. At first Mr. Scudamore's estimates of capital and gross revenue gave very encouraging figures, as he showed first a gross revenue of 27 per cent. on the capital, and then of 19 per cent., and he estimated to obtain a net revenue of 8.8 per cent. at first and then of 5.9 per cent. But when he raised his capital expenditure from three millions to six millions his percentage of gross revenue dropped from 19.6 to 12.3 per cent., and it was only by estimating the gross revenue at very liberal figures and cutting down the working expenses very materially that he was able to show on the increased capital expenditure sufficient margin of profit to provide for interest and sinking fund. I have made this brief analysis of the figures in order to show that the scheme on its financial side received very little practical investigation, as the estimated figures for gross revenue and working expenses were clearly manipulated when the estimate of capital required was doubled, in order still to show a sufficient balance of profit. This is made additionally clear by the ratio of expense to gross revenue, which in the first estimate was put as high as 67½ per cent., and in the third was reduced, with no apparent justification, to 51½ per cent. The remaining figures in the tables show how completely unreliable all the estimates were as a guide to the actual financial results of the State telegraph monopoly. When the Telegraph Act was passed the maximum capital expenditure was put at £7,000,000, but within a very few years it grew to almost £11,000,000, and a very large proportion of this was spent in extending the telegraph system after it passed into the hands of the Post Office. The actual expenditure on purchase of telegraph properties was, as finally estimated, between six and seven million pounds. The increased capital expenditure would not have mattered if the estimates of working expenses had been justified in practice; but, as will be seen by the tables, the working expenses rapidly and steadily increased. Within a few years they were 90 per cent. of the gross revenue, and for a good many years past they have been over 100 per cent. of the gross revenue. The result has been that no payments have been made to sinking fund to extinguish the original capital, and the interest on that capital has now to be paid by the taxpayer, while all additional capital for the development of the telegraph system has to be supplied by the taxpayer and is not charged to a capital account. This is not a satisfactory state of affairs for a great electrical industry, which, in the hands of private enterprise, would be made to pay its way.

## POST OFFICE TELEGRAPHS—1866-1909.

(Table I)

## ESTIMATED AND ACTUAL CAPITAL EXPENDITURE.

1866	Mr. Scudamore's 1st Estimate	..	..	..	£2,500,000	
1868	" " 2nd	..	..	..	3,100,000	
1868	" " 3rd	..	..	..	6,000,000	
1869	" " 4th	..	..	..	6,750,000	
1869	Telegraph Act Vote	..	..	..	7,000,000	
1871	" " "	..	..	..	8,000,000	
1872	Actual Expenditure	..	..	..	8,656,000	
1875	" " "	..	..	..	9,790,198	
1876	" " "	..	..	..	10,071,536	
1876-77	" " at closing of Capital Account	..	..	..	10,948,173	

## ESTIMATED AND ACTUAL GROSS REVENUE AND WORKING EXPENSES.

		Gross revenue.	Working expenses.	Ratio of expense to revenue.	Surplus.
1866	Mr. Scudamore's 1st Estimate	£676,000	£456,000	67½	£220,000
1868	" " 2nd	608,000	425,250	70	182,250
1869	" " 3rd	737,000	379,000	51½	358,000
ACTUAL RESULTS:					
Year 1870	..	612,301	350,376	57.8	261,925
" 1871	..	735,390	494,002	67.2	239,695
" 1872	..	973,332	733,908	80	139,424
" 1873	..	1,049,162	956,170	91	92,992
" 1874	..	1,167,745	1,039,912	89	85,808
" 1875-80	..	1,469,795	1,136,291	77.2	296,508
" 1880-90	..	2,323,423	2,073,835	89	249,588
" 1890-1900	..	3,330,542	3,421,323	103	90,781
" 1900-1909	..	4,325,723	4,837,125	112	511,392

The reasons for the failure of the Government to run a business on business lines are several, but they may be summed up in the general statement that under political control a technical business cannot be operated on business lines. There is constant pressure brought by the public or by bodies having political influence to obtain reduction in rates, and there is constant pressure brought by the staff to obtain improvements in pay and conditions. Moreover, it is a well-known fact that the same general efficiency of staff cannot be obtained in a Government Department, where employment is permanent, as can be obtained in private employ, where pay and promotion depend upon efficiency. Some of these causes were very early at work in the State telegraph monopoly, as within four years the working expenses had more than doubled, although the increase of traffic was only 50 per cent. The estimated staff required was 1,529 clerks and 1,283 messengers. Within six months there were 4,193 clerks and 3,116 messengers, or nearly three times the estimated staff, and more than double the aggregate staff of the various telegraph companies which were taken over. These facts were brought out by a committee appointed in 1875 to investigate the increased cost of the telegraph service since the acquisition of the telegraphs by the State, and this committee found that the ratio of working expenses to gross revenue had risen from 57 per cent. to over 96 per cent. within four years.

Since 1876 there has been no enquiry into the working of the State telegraph monopoly, and matters have been allowed to drift, and currency has been given to the convenient explanation that the large annual loss in working is due to the high price paid for the telegraph properties at the time of the purchase. The figures I have given show that the capital expenditure has no bearing on the present financial results, since there is an actual loss on working and no interest on capital can be paid out of telegraph revenue.

## POST OFFICE TELEGRAPHS

(Table II)

## PERCENTAGE OF GROSS AND NET REVENUE ON CAPITAL.

## A.—GROSS REVENUE

			Capital	Gross revenue.	Percentage.
1866	1st Estimate	..	£2,500,000	£676,000	27
1868	2nd	..	3,100,000	608,000	19.6
1868	3rd	..	6,000,000	737,000	12.3
1869	4th	..	6,750,000	737,000	10.9
1869	Vote	..	7,000,000	737,000	10.5
1871	Expenditure	..	8,000,000	735,390	9.2
1872	"	..	8,656,000	973,332	11.2
1875	"	..	9,790,198	1,270,002	13
1876	"	..	10,071,536	1,313,107	13.1
1877	"	..	10,948,173	1,333,513	12.2

## B. NET REVENUE

			Capital.	Net revenue.	Percentage.
1866	1st Estimate	..	£2,500,000	£220,000	8.8
1868	2nd	..	3,100,000	182,250	5.9
1868	3rd	..	6,000,000	358,000	5.95
1869	4th	..	6,750,000	338,000	5.3
1869	Vote	..	7,000,000	338,000	5.13
1871	Expenditure	..	8,000,000	238,695	2.98
1872	"	..	8,656,000	139,124	1.6
1875	"	..	9,790,198	82,618	.84
1876	"	..	10,071,536	119,913	1.19
1877	"	..	10,948,173	125,108	1.1

A fact which is a crushing indictment of State ownership of a technical industry is that, notwithstanding all the improvements which have been made in telegraphy in the past 40 years, the working cost per message is higher to-day than it was 40 years ago. The message of to-day averages not much over half the length of the message of the old days of 1s. for twenty words of text, with free address and signature. During the past 40 years there have been innumerable improvements in telegraphic methods and appliances. The use of hard-drawn copper wire instead of iron wire, the adoption of duplex, quadruplex and multiplex working, the Wheatstone automatic system and other systems of rapid machine telegraphy have all tended to increase the output of the telegraph plant. Yet with all these advantages, and with an average message of about half the length of the message under the 1s. rate, the working cost per 1,000 messages is to-day £42 as against £40 in 1870.

Such is the financial working of a State monopoly in which in one way and another some 35 millions of money have been sunk, and which has a present revenue and expenditure approaching five millions a year. Before discussing the effect of the existence of this monopoly upon other means of electrical communication, it is worth while to take one more dip into history on the question of monopoly. When it was first proposed that the State should acquire and work the telegraphs, a monopoly was not asked for. In fact, the Post Office disclaimed the desire for a monopoly, and argued that in efficiency and economy they would be able to beat all comers. The first Select Committee which examined the Telegraph Bill reported "that it is not desirable that the transmission of messages for the public should become a legal monopoly in the Post Office." In the following year the Post Office pressed for a legal monopoly, on the score that without a monopoly opposing schemes might be started for the purpose of being bought out. The second Select Committee was reluctant to grant the Post Office a legal monopoly, and it is evident that public opinion at the time was opposed to putting such absolute power over the telegraphs in the hands of the Post Office. However, the monopoly clause was inserted in the Telegraph Act of 1869, and henceforward electrical communication became a State monopoly under the control of the Postmaster-General.

## EFFECT OF THE TELEGRAPH MONOPOLY ON THE TELEPHONE.

Some years after Parliament granted the Postmaster-General a monopoly in telegraphs the telephone was invented, and when companies were organised in Great Britain to put this marvellous invention at the service of the public the Postmaster-General brought suit against those companies for infringement of his telegraphic monopoly. The result was that the telephone was found to be legally a telegraph within the meaning of the Act, and the telegraph companies had to accept the Postmaster-General's terms or give up their business. At this date (1880) the Postmaster-General had acquired sufficient experience of the unprofitable nature of the telegraph business under Government ownership to be unwilling to experiment with a new invention, the commercial capabilities of which his advisers distrusted. Consequently the Post Office did not at once go into the telephone business, but licensed the telephone companies to continue the business under very rigorous terms and conditions. In fact, the early licenses were so rigorous, confining the operations of the telephone companies to certain extremely limited areas, that in a short time the Postmaster-General was forced by public opinion to grant a more liberal license, abolishing the restricted



areas and extending the license to the whole country. From the very beginning, however, the telephone was looked upon as a competitor of the telegraph and was compelled not only to pay tribute to the telegraph, but to remain in a relatively subsidiary position. A royalty of 10 per cent. of the gross receipts from telephone exchange business had to be paid to the Post Office and the telephone was forbidden to be used for written messages, and numerous other difficulties and restrictions were imposed. Probably the greatest of these difficulties, and one which has worked the most harm to the development of the telephone, was that statutory powers for the telephone companies to run their wires were refused them. All efforts to obtain these very necessary statutory powers have been consistently opposed by the Government. Another great difficulty, which has become increasingly acute as the present year has approached, was that the license was made for 31 years from 1880, terminating on the last day of 1911, but no provision was made for the continuance or conduct of the telephone service after the expiry of the license. The Government reserved the power in the license to give notice of their intention to purchase the telephone business at intervals of seven years, but this option has never been exercised. The telephone companies therefore have been in the unfortunate position of carrying on a difficult technical industry under these great adverse conditions of lack of statutory powers and of a limited life with an uncertain end. These conditions have completely prevented any broad policy of development of the telephone, and the British public have been the sufferers.

At the present time we have 644,000 telephones in service in the United Kingdom, whereas if the telephone were developed in the same ratio in proportion to population as it is in the United States, we should have nearly 3,000,000 telephones in service, and consequently vastly improved means of communication, in every city and throughout the whole country, compared with those which now exist. It has been said by very competent observers that one of the most important items contributing to the commercial and industrial efficiency of the United States is the widely developed and highly efficient telephone service enjoyed by the American community. This service puts city in instant touch with city, and every part of large city areas in instant touch with every other part. The value of such rapid and general communication can hardly be over-estimated, and it is difficult to estimate the loss which other industrial communities suffer from the lack of it. There is no difficulty in building up in this country an extensive and as efficient a telephone service as that which exists in America to-day. It is a question simply of capital, management and adequate powers.

Time will not permit of tracing in detail the vicissitudes of the telephone business in this country. I have just shown that the fundamental conditions of limited license and absence of statutory powers have been ever-present obstacles, but the fact that the telephone has been regarded as a sort of chartered infringer of a State monopoly has caused it to have a most eventful career during its brief life of 30 years. The State telegraphs, despite the millions of public money which they have swallowed up, have had no inquiry since 1876, and have been allowed to go their way in peace, but the telephone business, which has been a commercial business, and paid its way, has been subjected to one inquiry after another and to one change of Government policy after another. At first the telephone companies were chained like a convict by the leg and limited to small areas. Then they were allowed to roam freely over the country and to build trunk lines to connect various centres together. Then the Government decided that it would take the trunk lines, in order to protect the telegraph revenue—which had long ceased to exist! There has been a succession of Select Committees on the "telephone question," and for some years in the nineties the telephone companies were hardly left any time to look after their business, so many questions did the management have to answer. In 1899 came the late Mr. Hanbury's policy of municipal competition and of Post Office competition with their own licensee. This policy was frankly intended either to make the purchase of the Telephone Company's system at the end of the license an easy matter, or else to render it unnecessary for that purchase to be made at all. When it became clear that this policy had failed, the agreement of 1905 was made. Under this agreement the National Telephone Company engages to sell its plant to the Postmaster-General at its value as working plant, and the present aspect of the telephone business is that within a short time it will become a complete State monopoly.

No business man, I believe, looks forward without misapprehension to the establishment of a State monopoly in the telephone. No business man expects either the high efficiency or the wide development of the telephone which his business interests require if the telephone industry is to be subject to political control and to the uncommercial methods of a Government Department. We have drifted into the present position through the unfortunate error made 40 years ago of granting the Post Office a legal monopoly in the telegraph, a step which by many was considered an error at the time, and which was totally unnecessary if the State had been capable of operating the telegraph business efficiently and economically. The telegraphs, as a recent Postmaster-General has said, are past praying for, but no business man wishes to see the telephone industry (which is capable of far greater development and usefulness than the telegraph) go the same way and become a financial incubus for which annual apologies have to be offered. Under such conditions the rapid development which is so desirable would become impossible, as even the Government would not continuously put large sums of money into the development of an unprofitable venture. Even if the Government telephone service showed a profit, it would still not be developed at the rate necessary to meet the business requirements of the country, for the simple reason that the financial control would vest in the Treasury and not in those directly responsible for the conduct of the business. Treasury control of public money must in its nature be narrow and rigorous, and cannot be stimulated by the commercial considerations which are of the first importance in dealing with a rapidly expanding enterprise.

#### THE REAL REQUIREMENTS OF THE TELEPHONE SERVICE.

There has been some discussion lately in different parts of the country of a single aspect of the telephone question, the question of rates. To the business

man this is by no means the most important part of the subject. The business man wants a highly developed and highly efficient telephone service. He wants to be able to reach by telephone everyone with whom he has business and to reach them quickly and effectively. If he has that general and efficient service he is perfectly willing to pay a fair price for it. To bring the telephone service of Great Britain to the pitch of development and efficiency which the commercial interests of the country require, that is, to plant five telephones for one that is now working, will require a large expenditure of capital and an enterprising and progressive management. To secure this flow of capital—several millions a year for many years to come will be required—and to secure the progressive management necessary for the upbuilding of the service, it is essential that the solution of the telephone question shall be on commercial lines and not on those of a State-owned monopoly. Much prejudice has been aroused against the extension of the telephone license to an ordinary private company, and there is a large body of public opinion which is opposed to State monopoly. A solution can be found which meets both these views.

#### A TELEPHONE AUTHORITY FOR GREAT BRITAIN.

This solution consists in creating a Telephone Authority on the lines of the Port of London Authority, which would take over the telephone plant both of the National Telephone Company and of the Post Office, and would operate and develop the telephone service of the whole country on commercial lines.

The present position of the telephone business is that four-fifths of the local service is conducted by the National Telephone Company, the Post Office owning the trunk lines and portions of some of the local systems. Of municipal telephone systems there remain but two, those of Hull and Portsmouth, which are operated in competition with the National Company's systems in those towns. Under the agreement of 1905 the National Company is to sell its plant at the value that may be fixed by arbitration. The Telephone Authority would take over not only the plant of the National Company on the terms and conditions fixed by the agreement, but also the telephone plant of the Post Office and of the two municipalities on similar terms. The whole system would then be consolidated and operated by one organisation, which would have for its single object the development and improvement of the telephone service of the whole country.

The financial operation involved would be of considerable magnitude, but presents no insuperable difficulties. When the valuation of the plant is arrived at the Telephone Authority could exchange its stock for the existing securities or could raise money if necessary to purchase the plants for cash. In the case of the Post Office telephone plant some difficulty might be found by the Government in parting with its property except for cash, but this point might be got over either by the Telephone Authority assuming responsibility for the terminable annuities on which the Government telephone capital has been raised, or by issuing in exchange for the Government telephone plant debentures redeemable at an early date.

The difficulties which there may be in dealing with the present capital of the combined telephone business of the country, amounting to approximately £26,000,000, are nothing compared with the advantages of placing the whole telephone business under a single Telephone Authority, which would be a commercial body and would readily obtain the continuous flow of new capital necessary for the rapid development of the telephone service throughout the country. For some years past the telephone business has been almost in a state of arrested development. To provide for the real needs of the country in telephone facilities and to bring the entire service to an adequate pitch of efficiency will require the expenditure of several millions of capital every year for many years to come. Such a flow of capital can only be obtained if the enterprise is to be a productive one, and it can only be productive if operated under commercial conditions. If operated under commercial conditions, giving continuously improving facilities to the public at reasonable rates, and economically administered, it is certain to be productive, and consequently there will be no difficulty in obtaining the continuous supply of capital necessary for wide development. The dividends would be fixed at a figure which would tempt the investor, and if excess profits are made as the result of more economical methods of conducting the service, part of such excess profits could be devoted to a bonus on the capital and part to a reduction of rates or to the increase of facilities for the benefit of the public.

The Telephone Authority would take over the staff of the National Telephone Company and the telephone staffs of the Post Office and of the municipalities, thus securing the continued services of those experienced in a highly technical and specialised business. This would not only benefit the business itself, as the continued effort of those long experienced in the work is essential in such a technical industry, but it would allay the feeling of unrest and disquietude in a large body of skilled workers up and down the country. It is well known that political agitation has become permanently established among all branches of the Post Office staff, and the addition of some 18,000 employees to that staff, which would occur under the contemplated transfer of the whole telephone system of the country to the Post Office, is calculated to increase that agitation, with the results of which all members of Parliament are familiar. If the whole body of telephone workers were placed under a commercial management this political agitation would entirely disappear so far as that body is concerned, and it is a large body at present and will increase very greatly if the telephone service is adequately developed. Not only that, but the conditions of employment, the opportunities, and the general results to the workers would be more satisfactory to the great majority of them in an organisation imbued by the commercial spirit than in a Government Department.

The general direction of the Telephone Authority would be conducted by a board of management, on which, besides the stockholders, the Post Office, the Treasury, the municipalities, and the chambers of commerce would be represented. Such a broad representation would give, besides the commercial and financial control which I maintain is essential to the sound operation of a great technical industry capable of almost indefinite expansion, the requisite measure of public control to safeguard the interests of the Government and the interests

of the general public with regard to efficiency, sound development, and reasonable rates. The Post Office and the Treasury would be entitled to a voice in the management as representing the Government, because, presumably, the Telephone Authority would continue to be a licensee of the Post Office, and would pay the Post Office a royalty, which would in time, no doubt, more than fill up the annual telegraph deficit. The municipalities and the Chambers of Commerce should be represented on the Board, in order that those bodies may be properly advised as to the real merits and difficulties of the telephone business. At present a good deal of agitation is being conducted by some of the municipalities and Chambers of Commerce, but it is, in my opinion, a misguided agitation, as it is based almost entirely on the question of rates, whereas the main interest of the business community is that the telephone service should be developed more widely and brought to a higher state of general efficiency. This cannot be done unless the payment for service yields sufficient margin of profit to make the business self-supporting and to tempt new capital into it. If the telephone is widely developed and the service made highly efficient, the business public will never grumble at reasonable rates which enable these results to be accomplished. Therefore it would be an advantage that the municipalities and the Chambers of Commerce should be represented on the board of management of the Telephone Authority, in order that they may be able to inform their constituents of the real merits of the telephone business, of its difficulties and of its requirements.

It is not possible to develop fully in the course of a brief paper all the advantages of the proposal which I have outlined, but I might summarise them as follows:—

Under a Telephone Authority for the whole country, conducting the entire telephone service of the country on commercial lines—

1. The interests of the public would be more effectively safeguarded than under a Government monopoly.
2. By maintaining a commercial organisation the development of the telephone service would be continued more rapidly, more economically and more efficiently.
3. The Post Office would be assured of a growing income in royalties. Under Post Office ownership a deficit on the working of the telephones would probably occur, as has happened with the telegraphs.
4. Direct political control being eliminated, the development of political agitation and pressure on members of Parliament, already an evil of considerable magnitude in the Post Office, would be arrested so far as the telephone staff is concerned.
5. A large body of skilled workers would be employed under conditions promising steady improvement and development with the rise in magnitude of the industry.

The King some years ago said: "Wake up, England!" Lord Furness, in a spirited letter to *The Times* the other day on the commercial future of Great Britain, said: "I cannot resist the feeling that we are half-hearted about it all. We say 'Wake up, England!' and we mean that some other body is to wake up. . . . For an overmastering and consuming passion to capture trade on scientific lines one has to look elsewhere."

Now, on this most important question of the future of the telephone service, I hope the London Chamber of Commerce will wake up, and wake up loudly and quickly and effectively. The telephone service is a great channel of trade and commerce. There is no other means of communication which comes within measurable distance of the rapidity and directness of telephonic communication. In telephone development we have achieved only 20 per cent. of that which we ought to have achieved by this date. That 80 per cent. of un-development represents a vast daily loss to the community in time, effort and money. If the London Chamber of Commerce uses its great influence to prevent the telephone service from being consigned to the stagnation of a State monopoly it will do a signal service to the commercial interests of the whole country. That it will also relieve the political authorities of much embarrassment I believe also to be true, for no sensible statesman really wants to make a huge inflation of the civil service or a great addition to Government trading. The present position is due to a policy of muddle and drift, because no one with a voice to be heard has woken up. But it is not too late to wake up to the realities of the telephone question.

### METROPOLITAN STAFF HOSPITAL COLLECTIONS.

The third annual general meeting was held at 57, London Wall, on Wednesday, Feb. 1, the attendance being very gratifying from the point of view of enthusiasm and interest, if not in actual numbers.

Mr. Caparn, of the Head Office Stationery Department, who presided, stated his regret that the Metropolitan Superintendent, who had consented to take the chair, was, by his doctor's orders, obliged to abandon his intention and that Mr. Harvey Lowe and Mr. Stirling were also unable to be present through illness.

The report of the hon. secretary for the year 1910 was then read and adopted. This showed the total subscriptions for the year to be £750 19s. 5d., being an increase over the previous year of £35 os. 4d., the benefits issued to the staff and their relatives being 739, an excess of 33 over 1909.

Mr. A. W. Davis, secretary of the Hospital Saturday Fund, with which institution the staff collections are associated, gave a most interesting address, covering details of the work done through the fund during the past year, and much valuable information on some of the vexed questions which arise from time to time between contributors and collectors in connection with letters issued to non-subscribers, the impossibility of preferential treatment at hospitals, and the methods of dealing with complaints made against institutions.

Mr. A. C. Greening proposed that a very hearty vote of thanks be accorded to Mr. Davis for his attendance that evening, humorously regretting that he was not a "telephone man," since he showed the same enthusiasm and eager propensity to spend his evenings at meetings or studying problems in connection with his daily work. Mr. Davis briefly responded.

The re-election of Mr. J. Leslie as hon. treasurer and Miss F. J. Minter as hon. secretary was then proposed and unanimously agreed.

The re-election of 25 and election of eight newly nominated delegates to the Hospital Saturday Fund was then put and carried unanimously.

With a hearty vote of thanks to Mr. Caparn for presiding, to which he suitably responded, the meeting closed.

The following particulars from the hon. secretary's report are of interest:—

Another record has been established in the collections for the Hospital Saturday Fund. The total subscriptions amount to £750 19s. 5d., being an increase of £35 os. 4d. over 1909, to which the principal contributors were—

	£	s.	d.
Head Office .. .. .	68	10	3
Metropolitan offices .. .. .	71	9	3
Traffic Department .. .. .	36	2	4
Engineers' .. .. .	91	14	0
Maintenance Electricians .. .. .	64	14	1

Thanks are due to the Company for the part they continue to take in their staff's work in aid of hospitals by bearing the working expenses of the collections (thus enabling the actual amount annually subscribed to be paid in to the fund), to Miss Reekie and the organisers of the Bank whist drive for the substantial addition to our subscriptions for 1910.

The total number of letters, etc., issued was 739, showing an increase of 33 over 1909, and forming a record in this respect also.

These were distributed among the following departments:—

Head Office .. .. .	70
Metropolitan Office .. .. .	56
Maintenance Electricians .. .. .	66
Construction .. .. .	30
Engineers' Department .. .. .	133
Traffic Department .. .. .	243
Contract .. .. .	11
Stores .. .. .	63
Metropolitan Workshops .. .. .	14
Necessitous cases outside the staff .. .. .	47

It will be seen that a big advance has been made in the number of letters issued to non-subscribers—an increase of 22 over the previous year. The hon. secretary has no hesitation in stating that these were, without exception, deserving cases.

The following are the members of committees, and against each committee is shown the number of regular meetings which the members are called upon to attend. In addition to these, there are also many sub-committee meetings throughout the year:—

Executive committee (24 meetings yearly): Mr. J. Stirling, Mr. T. Caparn. Finance committee (12 meetings yearly): Mr. J. Stirling, Mr. P. Mantle. Distribution committee (25 meetings yearly): Mr. G. Buckeridge, Mr. T. Caparn. Surgical appliance committee (61 meetings yearly): Miss A. Reekie, Mr. G. H. Wilkinson. Collection committee (15 meetings yearly): Miss E. Richards, Mr. A. Macfarlane, Mr. G. Ruppertsberg. Ambulance committee (12 meetings yearly): Mr. G. Sandell.

### INSTITUTION OF POST OFFICE ELECTRICAL ENGINEERS—METROPOLITAN CENTRE.

THE fourth ordinary meeting was held on Jan. 16, when Mr. L. J. Sell read a paper on "Testing Paper Core Underground Cables during Construction."

At the outset, Mr. Sell enumerated the tests applied during the process of drawing in and jointing of paper core cables. These tests are (1) electrostatic capacity; (2) continuity; (3) absence of crosses; (4) conductor resistance; (5) freedom from contact; (6) insulation resistance; (7) absence of cross-talk; (8) pressure. These are applied at various stages of construction to the three principal classes of cable in use by the Post Office, viz., main trunk cables, subscribers' main cables, distribution cables.

The usual method of taking these tests on single wire, twin, multiple twin, and quadruple pair cables, and the effect of faults on working, were very fully described.

The fifth ordinary meeting was held on Feb. 13, Major W. A. J. O'Meara, C.M.G., R.E., in the chair, and Sir Matthew Nathan, G.C.M.G., R.E., the Secretary to the Post Office, being present.

Mr. E. W. Pettitt read a paper on "Conveying Systems," with special reference to their adaptability for use in post offices.

The paper was of more than ordinary interest, inasmuch as it is now generally known that the authorities of the Post Office have been considering this matter and making experiments in connection therewith for some time past, and there is not much doubt that every effort will be made to instal conveyors in the future.

During the discussion which followed, Mr. H. C. Gunton, Principal Power Engineer to the Post Office, stated that he had visited most of the principal towns in the United Kingdom with a view to seeing whether conveyors could be suitably employed in their respective post offices, and briefly outlined what attention headquarters had given to the matter.

Major O'Meara, in his closing remarks, said that conveyors were very often desirable in cases where the work had outgrown the size of the office, and they might then be installed to save the erection of a larger building. This was one point of view from which the question should be looked at.

## CALL OFFICES WORKED BY ATTENDANTS.\*

By O. ROBINSON, *Inspector, Paddington.*

THE call offices in London are divided into three classes, namely: Automatic call offices, attendant call offices where the attendant is *not* supplied by the Company, and attendant call offices where the attendant *is* supplied by the Company.

The latter class, which forms the subject of my remarks, is decidedly smaller than the other two, as will be seen from the following table:—

In view of this fact, there are, of course, only a few points of interest connected with them. However, there are some.

	Total lines.
Automatic pay box .. .. .	2,655
With Company's attendants .. .. .	92
" other .. .. .	215
<b>Total</b>	<b>2,962</b>

Number of separate sites with Company's attendants	19
Principal sites.	No. of boxes.
Piccadilly Circus Station .. .. .	10
Bank (C. & S.L.Ry.) Station .. .. .	7
Monument (District) Station .. .. .	6
Cannon Street (S.E. & C.) Station .. .. .	5
Holborn Station .. .. .	4

The structure of an attendant call office is so familiar to every one that it will be only necessary to describe it very briefly. In most cases there is a row of cabinets at the end of which is placed the attendant's booth. At one exceptionally busy call office there are two booths.

There are some call offices which do not possess a booth at all. As a matter of fact, they have only one instrument and one cabinet each. I refer to three call offices in the Holborn district. They



FIG. 1.—ATTENDANT CALL OFFICE.

are termed kiosks. These are little iron huts built on the side of the road. The attendant stops inside until a caller comes, then waits outside while the caller speaks—a most unpleasant circumstance if the weather happens to be wet—which is a not unusual occurrence in London. The sides of the kiosks are covered with advertisements of different railways.

The booths are fitted in front with a desk, underneath which is a till. At the back of the booth a locker is placed, usually screwed on to the wall from 2 to 3 feet above the ground. This locker, in many cases, does duty for a seat. A somewhat curious circumstance in connection with these seats is that new attendants, after using them for an hour or so, exhibit a peculiar tendency to stand up at



FIG. 2.—KIOSK.

their work. At the side of the booth, usually the left side, is the attendant's switchboard. This consists of a row of keys, the number, of course, determined by the number of cabinets at the call office. The instrument for the attendant's own use is usually a pedestal set, but in two or three cases the traffic is so heavy that it is impossible to cope with it if the attendant has one hand constantly occupied with holding up the receiver. In such cases a head set is used.

A book, which might be termed a day book, an indelible pencil and a clock complete the attendant's outfit.

Experiments have been made recently with the object of ascertaining the best method of entering the calls in the book. I will describe three methods. The one which was in vogue before the experiments were made and two new methods, one of which was finally adopted.

In the old method directly a call was given in to the attendant he entered the exchange and number on his sheet, simultaneously passing the call to the exchange. When this was done he took the fee and informed the caller on which instrument to speak. He then filled in his sheet—and his counterfoil. The entries on sheet and counterfoil were coincident. On each he entered the exchange and number required, the time, the number of the cabinet on which the caller spoke, and the fee—if the call was effective. If for any reason the call was ineffective it was struck out, and, if the caller waited, re-entered every time it was tried. The disadvantages of this method are obvious. In the first place, the counterfoil was quite unnecessary; it was so seldom referred to that it was practically useless. In the second place, the filling of so many details—ten entries per call—was so long a process that the attendant during a rush had to leave practically everything but the exchange and number and fill them in by guesswork afterwards.

In the two new methods tried the counterfoil is dispensed with entirely.

In the methods of the two which were not adopted every number passed to the exchange was not entered, but only the

\* Paper read before London Operators' Society.



ineffective ones. It was considered unnecessary to make a record of the effective ones. The caller had his conversation and the Company had the fee. Nothing further need be said or done over the transaction. Not so, however, with the ineffective calls. A note of these numbers must be kept, because they have in most cases to be tried again. If this were not done it would necessitate the attendant's asking the caller afresh for the number every time he tried it—a process which would rouse the ire of a good many callers. In the money column, instead of the figure 2 being made, a tick is put.

In the method finally adopted the calls are entered just the same as in the old method, but, there being no counterfoil to fill in, exactly half the time is taken over each call. This method is by far the most satisfactory.

Now we come to the most important part of the subject. The attendant call office from the point of view of the public. First of all, let me say, judging from the remarks made by callers, the average caller most certainly prefers the attendant call office to the automatic call office. There are some exceptions, however. One particular class of caller is constantly remarking: "Can't I do it myself," and so on. He seems to get especially particular when he has anyone with him, and still more so if it happens to be a lady. He wants to demonstrate his cleverness. It is really surprising to what lengths some people will go under these circumstances.

There is another class of caller who appears to imagine that the attendant is going to tell every person with whom he comes into contact what number the caller rang up, to whom he spoke and all about his business. He takes it for granted that the attendant listens to his conversation from beginning to end. He will often enquire where the nearest automatic box is on the plea that he wants more privacy.

One section of the public—and it is not so small as one would imagine—is apparently under the impression that the Telephone Company is an institution formed solely for the purpose of swindling it out of twopence. The attitude of this particular caller, if it was not so absurd, would be quite amusing.

In spite of all these, however, by far the greater number of callers think that the attendant call office is a long way ahead of anything else the Company has in the way of public telephones. We often hear said such things as "Oh! I think this is a much better idea; all you have to do is to speak to the people, the attendant gets you on." For business men, too, the system is much more convenient than the automatic box, especially if they want several numbers. They give the attendant the list of numbers, pay the fee, and have the numbers put on to the particular cabinet into which they go, one after another, without having to fuss about getting coppers. Ladies, also, appear to appreciate the attendant's presence very much. One lady is often heard remarking confidentially to another: "You know, I never *could* manage these 'slot things.'"

Some callers just can't get that automatic box out of their minds, and some of their actions in consequence of this are quite amusing. A caller will ask the attendant for a number, put his money on the desk, and when he is advised to go into the cabinet pick up his money again with the intention of putting it in the slot, and does so if the attendant isn't quick enough. Some callers even put the money in after paying the attendant once. This is done in spite of the fact that there are notices stuck in the slot of the money boxes to the effect that the attendant is to be paid.

The funniest case of this kind I ever saw was when one caller, after asking and paying for his call, went into the cabinet and found the busyback on. He immediately started putting pennies in the slot. After he had put *six* in we discovered what he was doing. When asked the reason he said he thought he had to keep putting pennies in until the buzzing stopped!

There is one subject upon which all callers, however much they may differ upon other subjects, seem to agree. It is in their objection to the prepaid call. The one common reason is that they don't like to be treated as if they intended to get out of paying at every opportunity that presented itself. They admit that there are some people who are always on the look-out for a chance to do so, but they claim that the average caller is quite honest. Many of them take it as an insult when the attendant asks them for the fee

before he allows them to speak. Some even get quite angry and threaten to write in to the Company about what they term the attendant's insolence. A caller will often say, "When I go into a shop for anything they don't ask me to pay before I have what I ask for." They hold that it is not in accordance with the ordinary laws of business to charge a man before he has his goods. "A man," they say, "never expects to have his bill paid before he delivers his goods." Regular callers especially object to it. When a caller comes every morning in the week for his number or numbers he doesn't like to be asked morning after morning for his money in advance. One will often say, "Surely you know by now that I don't intend to go away without paying." It places the attendant in a very awkward position; he requires all his tact to smooth the callers over. A big percentage of the callers are regular ones, so it is easily understood that a lot of unpleasantness is caused by the enforcement of the rule. At busy call offices the calls must, of course, be prepaid to preserve order, but, personally, I think that if the attendant was allowed to use his own discretion a tremendous amount of unpleasantness would be avoided. Most of the attendants hold this view.

There is another important part played by the attendant with reference to the public—that of educator.

The ignorance of the general public on telephone subjects is surprising. A very common idea people have about the exchanges is that the operators are having tea all day, and only get up to answer a call when the bell rings. A very large percentage of callers have either never used a telephone before or have only used one on very rare occasions. These people, for some unaccountable reason, get horribly nervous when speaking on the telephone; they perspire and fidget about in the cabinet the whole time they are speaking, and emerge therefrom in a state of semi-collapse. Before they go into the cabinet they ply the attendant with numerous questions, and when they get inside forget every word he has told them. A very common mistake is to take the instruments for speaking tubes, speaking into the transmitter and then turning the ear thereto and listening. On such occasions a caller will come out of the cabinet and want to know why he can't get on. Some go still further. I had a taxi driver once who, after looking at the instrument for about two minutes, unscrewed the mouthpiece and put it to his ear.

These are the kind of people whom the attendant has to educate chiefly, but there are, of course, many points on which the rational caller desires enlightenment.

The last point in connection with the public about which I wish to speak is advertisement. The call office is, I think, one of the best ways of introducing the telephone to likely subscribers. If a non-subscriber goes to a call office and is connected to his number smartly he begins to think the telephone is an extremely good investment. In this connection operators should realise that every time they advise a caller "No reply" the Company loses *2d*.

Now just a word in closing about the attendants. All that is necessary I think to say on this point is that the attendants as a whole do their best for the Company.

The position of call office attendant is not at all an unpleasant one to hold, though, of course, it has its drawbacks.

I will close my remarks by saying that, in my opinion, if employees generally were treated with the consideration with which the Company's attendants are treated by the authorities over them we should hear a lot less about labour unrest than we do at present.

[As regards payment for calls in advance, it was pointed out in the discussion which ensued on Mr. Robinson's interesting paper that payment for railway and all kinds of public service is invariably made in advance. Moreover, the present system is more satisfactory to the attendant, as he would feel morally responsible for all defaulting callers' fees under a system of payment in arrear.—ED., "N. T. J."]

**"Local Office Work."**—The writer of the paper published in the January issue should have been described as "W. A." instead of "W. H." Taylor. The paper was read before both the Cheltenham and Bath Telephone Societies.

## GLASGOW NOTES.

ANOTHER step towards the unification of the system. The transfer of the Company's subscribers at Springburn Exchange to the new Post Office Exchange has been fixed for Saturday, March 18. About 150 subscribers are involved.

THE fifth meeting of the Telephone Society, Glasgow and West of Scotland districts, was held in the Lecture Hall of the Technical College on Friday, Feb. 8, Mr. C. J. Millar presiding. Two papers to be submitted for the Head Office premium competition were read, one by Mr. H. C. Sutherland, entitled "Steel Suspenders," and the other by Mr. J. D. C. Mackay, entitled "First Account to Dividend." The writers dealt with their subjects in an interesting manner, and after answering a number of questions which were put, were accorded a hearty vote of thanks. Thereafter an adjournment was made to the refectory.

THE members of the staff and friends of Tron and Gorbals Exchanges held their annual dance in the Trades Hall, Glassford Street, on Jan. 21, when about 72 couples were present. A most enjoyable evening was spent.

THE National Telephone Society, Glasgow and West of Scotland districts, have lost yet another office bearer, Mr. J. K. Murray, secretary, having been appointed to Inventory duty at Head Office. In order to fill the vacancy, a committee meeting was held on Jan. 26, when Mr. G. C. Dewar undertook to accept the joint duties of secretary and treasurer for the remainder of the session.

WE regret to record the death of Mr. John Fullarton, who was for about seven years an employee of the Company. The deceased, who was of a quiet, unassuming disposition, left the service some months ago, and had been in indifferent health for some time back.

THE fifth meeting of the National Telephone Operators' Society and Club was held on Wednesday, Feb. 15, in the Masonic Halls. This meeting was one of the red-letter nights of the club, the society being favoured with the presence of Mr. Napier, of the Engineer-in-Chief's Department, who delivered a very interesting and instructive paper on "Traffic," which was illustrated by lantern slides. The lecturer dealt with the standardisation of operating methods and the advantages to be gained by a knowledge of the reasons for doing things in a standard way, as well as the careful execution in the manner laid down. Owing to shortage of time, discussion had to be foregone, but Mr. Valentine, District Manager, who was present, made a few remarks touching on the advance in operating methods and taking a peep into the future with its probable advancement along semi-automatic lines. At the conclusion Mr. Napier was accorded a very hearty vote of thanks. Thereafter the social and musical part of the programme was proceeded with. The punctuality prizes for the evening were won by Miss M. Kinloch, City Exchange, and Miss E. M. McKenzie, Royal Exchange.

WE are looking forward with some pleasurable anticipation to Friday, March 3, when what may be the last Glasgow dinner during the Company's term will be held in the Grosvenor Restaurant. This dinner has come to be regarded as a Scottish function owing to the satisfactory attendance from other centres. There are special features this year which will no doubt bring a good attendance.

A VERY severe storm of wind and rain visited these parts on Thursday and Friday, Feb. 16 and 17, this being the worst which has been experienced since 1904. It is satisfactory to report, as a feather in the cap for the Engineering Department, that little damage to the plant was sustained, only odd wires in various parts of the district being broken down.

IT is with regret that we record the serious illness of Mr. C. T. Grant, a friend of the Company in Glasgow, who has rendered useful service. The best wishes of the staff are extended for his speedy recovery.

THE golfers in the district are again getting into trim. The opening meeting of the club will take place on Saturday, Feb. 18, when Carnynte will be the venue. So far the number of entrants has not come up to last year's figure, but this is accounted for by a number of the enthusiasts being absent on Inventory duty.

THE members of the staff and friends, numbering about 1,000, visited the Theatre Royal Pantomime on Friday, Feb. 3, Harry Lauder being the premier attraction, the pit and upper circle being reserved for the company on that occasion. The night unfortunately was of a rather unsatisfactory character, the city being enveloped in fog. This, however, did not militate against the enjoyment of the audience.

THE members of the Hillhead Exchange and friends held their "At Home" in the Charing Cross Halls on Saturday, Jan. 21, when about 75 couples were present.

## BOLTON DISTRICT BENEVOLENT SOCIETY.

THE annual meeting was held at Hamer's Commercial Hotel on Thursday, Jan. 26, Mr. A. C. Haley (the District Manager) being in the chair. The chief business was the election of officers. Mr. Haley was re-elected president for the ensuing year, Mr. Fallows treasurer, and Mr. J. Turner hon. secretary. The accounts showed receipts of £58 14s. 6d. and a balance in hand of £17 2s. 11d.

## IRON IN ITS RELATION TO ELECTRICAL ENGINEERING.\*

By THOS. PETTIGREW, Glasgow.

A CERTAIN famous scientist once remarked to an audience that of all the many wonderful substances in nature, perhaps the most wonderful of all was water. A moment before the lecturer had held his audience enthralled by his lucid and fascinating explanations of many scientific phenomena, and the remark seemed to suggest a sudden fall from the sublime to the ridiculous. The audience did not seem to take the remark seriously, but as the lecturer proceeded to open up the subject, it was borne in upon every listener how very much was wrapped up in the remark, and how very little heed we gave to seemingly commonplace substances and materials.

Water is so very closely associated with our very existence that we entirely fail to appreciate its very remarkable characteristics, and if we follow for a moment along the lines of the lecturer's explanations, it will show the truth of this remark:

Water is a necessity to animal and vegetable life. It is a colourless liquid. Its liquid state is maintained through a wide range of temperature—viz., from freezing to boiling point.

At low temperatures water freezes. The liquid becomes a solid. In the transition stage a sudden expansion takes place, and ice is some 10 per cent. greater in volume than an equal weight of water. The expansion is wellnigh irresistible, and is the cause of a tremendous amount of damage to water pipes, etc., when a severe frost sets in; but it is also a very wonderful provision of nature for the preservation of the fish life of our lakes and rivers, as ice, being some 10 per cent. lighter than water, is formed on the surface; and, further, the water under the ice is some 7 degrees warmer than ice, i.e., is about 39° F.

Under different circumstances water in the form of vapour in the air becomes frozen, and the beautifully light, soft and fleecy snowflake is formed. Every snowflake is a wonderful construction of beautifully designed geometrical figures, and it is significant to note that every design is hexagonal.

When water is heated, it finally boils and gradually disappears in the form of vapour. The temperature of boiling point depends upon the atmospheric pressure. At sea level it is higher than in the rarefied atmosphere at the top of a high mountain. When we confine this vapour as in the steam boiler, it becomes absolutely invisible.

Ice and snow are melted and become water by the absorption of heat.

Steam and vapour are condensed, and in coming back to the form of water deliver up heat.

These few facts do not by any means exhaust the wonders of water, but two more must suffice.

Water is incompressible. It is, therefore, very widely used in hydraulic machinery. Under pressure and confined, water may be said to be a liquid solid, as it is capable of doing work even through long and intricate passages in machines.

Lastly, water consists of two parts of hydrogen to one of oxygen in chemical combination. By electrolysis we can break up the water into its elemental gases. In these proportions the gases form a very violent explosive, and if ignited water is again formed.

The gases can be united to form water without explosion or noise, by using each gas as the plate of a "gas" battery.

Sufficient has been said to indicate how very true it is that we pay very little heed to many commonplace things, which, when looked into, prove to have remarkable and wonderful characteristics.

And now you may ask, What has all this to do with telephone work? My reply is—nothing. But we may ask ourselves, Have we any material or substance in common use in telephone engineering, which is very commonplace, and is so widely used that, like water, we merely accept the fact, and pay no more heed to it?

\* Prize paper read before the Glasgow and West of Scotland Telephone Society, 1909-10.

I venture to think we have, and were the supplies of that material to fail it would be nothing short of a universal calamity. The material I speak of is IRON.

Iron is the most wonderful metal we have. Man has used it in the construction of articles for ages, but we have to come down to modern times for its more extensive application. Write the story of the gradual expansion of the use of iron and steel during the last two centuries, and you write the history of the civilised world.

Think of the manifold uses of iron and steel at the present day!

Think of such monumental works as the Forth Bridge, the *Lusitania*, the *Dreadnought*, the modern naval gun, the locomotive and motor car, etc. Then consider the development in the production of the small article, such as the needle, the pen point, the ordinary nail, etc., etc., and the imagination simply staggers under the immensity and comprehensiveness of the development of the scientific application of iron and steel.

That immense industry embraced under the head of electrical engineering exists because iron exists and depends for its very existence on the supply of iron.

Now we all know that iron and steel are employed on structural work because of the enormous strength of these particular metals, but that does not explain why iron should be of such vital importance in electrical engineering. Practically every piece of apparatus which goes to make up that elaborate structure—the modern telephone exchange—has certain vital parts constructed of iron. From this you will conclude that iron must possess some valuable property or power which is absent from other metals.

It is to this peculiarly valuable property of iron that I want to direct your attention to-night, and, as the magnetic field may be said to be the fundamental basis of electrical engineering, I need offer no apology in bringing such a subject before you, especially as we are very apt to underestimate the importance of the part played by iron in conjunction with the magnetic field, and to accept as a matter of course the various results obtained.

We are all more or less familiar with the ordinary permanent magnet which can be bought for a few pence, and who amongst us has not at some time in his boyhood possessed a knife the blades of which would attract needles, pen nibs, etc., to the envy of his boy friends who were not so fortunate?

The knife was, to speak scientifically, permanently magnetised. Later we shall see what this means, and what conditions are necessary to bring it about.

The ancients knew of the lodestone, or natural magnet, an iron ore which exhibited magnetic powers found in central parts of Asia, and the history of the magnet is an interesting story, but we have not time to touch upon that phase of the science. The discovery of the electro-magnet in modern times gave great impetus to experiment and research, and when Faraday discovered electro-magnetic induction great possibilities were opened up. This was the birthday of electrical engineering, and if, as is the popular cry, electricity be still in its infancy, it is at all events an exceedingly well-developed and vigorously healthy child, and bids fair to be an enormous giant when maturity is reached.

Faraday did not rest content with the mere discovery of something novel and startling, but by patient investigation and laborious research, succeeded in establishing certain laws governing the various phenomena, and in formulating a theory to account satisfactorily for the various observed effects.

Faraday's laws form the fundamental principles of electro-magnetics, and it is absolutely necessary that we know something about them if we wish to take an intelligent interest in our work. Let us for a moment then touch upon Faraday's laws, and by experimental illustration show that the facts as laid down are correct.

First, when an electric current flows along a conductor, that conductor is surrounded by magnetic lines of force. They spring into existence with the start of the current, and are withdrawn when the current ceases to flow. So long as the current is steady the field round the conductor is steady, and it changes in value with a change of current strength. A reversal in current direction reverses the direction of the lines of force.

The second law is that if a conductor cuts, or is cut by, magnetic lines of force an E.M.F. is set up in that conductor.

To show that it is not necessary to have mechanical motion if the field is varying or alternating, connect two coils of wire, one to a galvanometer and the other to a battery.

If now our conductor be formed into a helix, the magnetic field will become much more concentrated than when the conductor was straight, and such a helix carrying a current shows all the properties of a magnetic needle.

And now we come to a most astonishing effect. If an iron core is inserted into the helix, although other conditions have not been altered, there is an enormous increase in the effect; in fact, the magnetic effect may be increased a thousandfold or more.

On this wonderful property of iron is built the vast industry of electrical engineering. Man has done nothing to the iron to give it such powers—the property is the work of nature.

Many theories have been advanced in explanation of the phenomenon, but the theory held at the present day is due to Professor Ewing, an illustrious Dundonian, than whom no one has given more study to the magnetic field.

The theory is simple, is very interesting, and will repay our study for a few minutes before proceeding further.

*Ewing's Theory.*—Iron in the mass is built up of molecules each of which is a natural magnet, is pivoted at its centre, and is capable of movement like a compass needle. The molecular magnets under natural conditions form themselves into closed magnetic chains or groups, are in a state of equilibrium and show no magnetic effect external to the mass of iron.

Consider now what happens to an iron bar when it is placed inside a solenoid and subjected to the magnetising force of an electric current, first of low value, then increasing step by step until a certain limit is reached.

The lines of force due to the current immediately thrust themselves through the iron bar from end to end. The molecular magnets are now subjected to two forces.

The first due to the controlling action which each group of magnets exerts on its component members, tending to preserve the symmetry of the group. The second due to the lines of force produced by the exciting coil tending to overcome the first force and deflect the molecular magnets so that they may take up a position with their N. and S. poles lying along the lines of force, i.e., pointing towards the end of the bar.

The magnets actually take up a position which is a resultant of the two forces producing distortion.

The iron bar will, under such conditions, exhibit low values of magnetisation and if the current be cut off, will cease to show magnetic powers. This is accounted for by the fact that the molecular magnets were only deflected out of their original position, were in an unstable condition, and returned to their original formation with the removal of the disturbing force. This is known as the first stage of magnetisation.

A most remarkable change takes place when the magnetising force is increased to a certain value. The lines of force begin to exert an enormous influence on the groups of molecular magnets. The controlling influence of the group on its individual members is overcome; by the directing influence of the lines of force, the molecular magnets are forced round on their pivots, and take up a position with their N. and S. poles lying along the lines of force. This is known as the second stage of magnetisation, and throughout a fairly wide range of magnetising forces, small increases in these forces produce very large increases in the resultant magnetisation values.

A point is reached where comparatively large increases in the magnetising force show relatively small increases in the magnetisation, indicating that the groups of molecular magnets are all pretty well broken up, and that the increase is due to a more perfect alignment of the molecules generally.

The iron is then said to be approaching saturation. This point is reached in wrought iron about  $B$  (i.e., the density of magnetisation) = 16,000 – 17,000.

It will be evident that if we can measure the magnetising force of the solenoid, and the value of the resultant magnetisation in the specimen, and if we can make a succession of these observations, beginning with low values and gradually increasing the magnetising



current step by step to a maximum, we shall have all the necessary data to plot the results graphically.

In practice a given specimen is tested through a complete magnetic cycle. This means that the specimen is tested from zero magnetising current, by gradually increasing steps, to saturation, and then by gradually decreasing the magnetising current, to zero. The current in the magnetising coil is then reversed and the same routine is gone through. At each step a careful note of the magnetising force, and the degree of magnetisation obtained, is made. The data enables us to plot a full characteristic curve for the given specimen under test. Fig. 1 shows such a curve.

B is the density, degree of magnetisation, or number of lines of magnetic force per sq. cm., often referred to as the "magnetic induction."

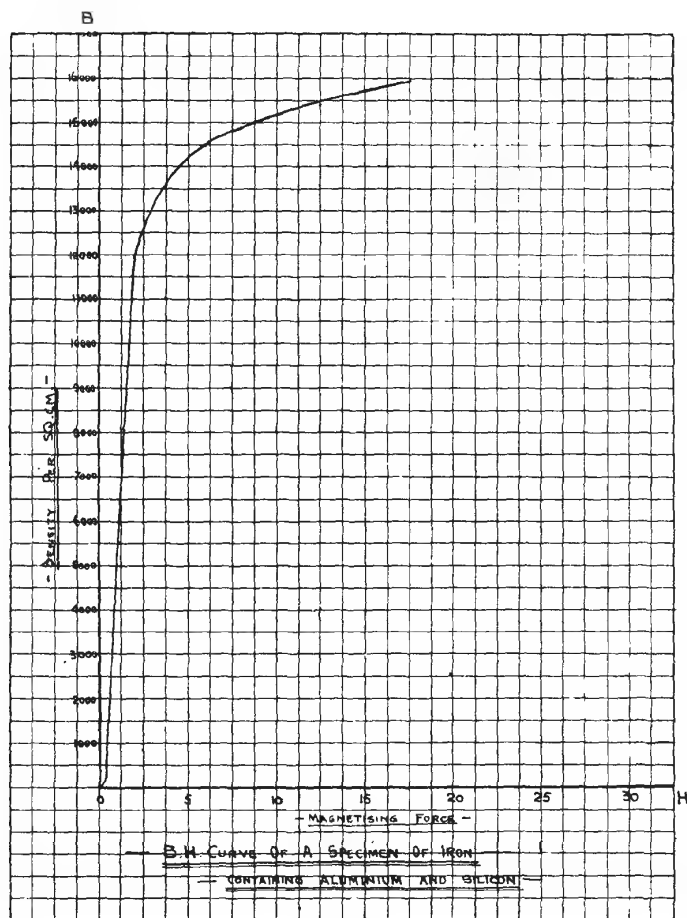


FIG. 1.

H is the magnetising force which was applied to obtain the corresponding value of B and is a measure of the number of magnetic lines of force which are produced by the magnetising coil when there is no core. H is calculated from the formula—

$$H = \frac{4\pi n C}{10 L} = 1.257 \text{ ampere turns per cm. of length.}$$

The junior members would find the following a profitable exercise:—

Plot out the data for a good average specimen of iron on a sheet of squared paper, and add the following extra particulars, viz.:

Calculate out the pull in lbs. at the various densities per sq. cm. and per sq. in., and fill in the curve.

H, the magnetising force, can then be modified to show also the number of ampere turns per cm. and per inch of length.

The curve will then be found to be very useful indeed.

The B H curve shows very clearly the three stages of magnetisation as outlined in Ewing's theory.

*First Stage.*—The value of B is practically proportional to the value of H. This portion of the curve is of great importance to telephone engineers.

*Second Stage.*—Small increases in the value of H are accompanied by very large increases in the degree of magnetisation. This portion of the curve is of great value to designers of alternating current apparatus.

*Third Stage.*—The curve bends over with a kind of knee, and thereafter rises but slowly, indicating the approach of saturation. This portion of the curve is of importance to designers who have to provide a steady field, not subject to much fluctuation with change in current strength, as in continuous current machines, etc.

*Hysteresis.* Notice particularly in the B H curve that when the magnetising force is gradually withdrawn, the magnetism tends to remain. There is a resistance to change in magnetic condition. The iron does not demagnetise along the line of magnetisation, but lags behind the magnetising force. Professor Ewing first discovered this effect, and gave to it the name of "hysteresis."

The complete loop obtained as the result of a test through a complete magnetic cycle is known as the "hysteresis loop," and its area is a measure of the energy expended in carrying the iron through that cycle. The energy so expended goes to heat up the mass of iron, and is therefore wasted; hence where rapidly varying or alternating currents are to be used, it is imperative that a very good brand of iron, with low hysteresis characteristics be employed, if reasonable efficiency is required. This is specially the case in telephone apparatus carrying speech currents, which have a frequency of 800 per second, i.e., the iron is carried through 800 magnetic cycles in one second, and, of course, the loss of energy is 800 times the area of the hysteresis loop for the particular brand of iron at the corresponding working density.

It is necessary also that in such apparatus iron wire cores be employed instead of solid iron cores. The reason for this will be made quite clear by reference to Faraday's law, which tells us that if a conductor cuts, or is cut, by magnetic lines of force an E.M.F. is set up in that conductor. Now, where an E.M.F. exists a current will flow, provided there is a path available, and, of course, in a solid iron core a very low resistance path is presented, and parasite currents, known as Foucault or eddy currents, will flow in the core at right angles to the lines of force producing the E.M.F. These currents are effectually prevented by using fine iron wire for the cores.

Their effects are harmful, of course, the efficiency of the apparatus is cut down, and the iron becomes heated as the result of their existence.

If we rotate a magnet close to, but not touching a pivoted copper or brass disc—the disc will revolve in the same direction as the magnet—the magnetic lines of force cut the copper disc, set up a drag and so produce motion.

A second experiment will show how very powerful the effects of eddy currents may be. A copper disc is introduced between the pole pieces of a powerful electro-magnet, and is rotated by a weight, acting on a string, wound on the spindle carrying the disc. When there is no magnetic field the weight descends very rapidly and drives the disc at a high speed, but when the current is switched on the copper disc becomes a powerful brake, due to the drag produced by the disc cutting the lines of force. So heavy are the eddy currents that the copper rapidly becomes too hot for handling.

I direct your attention now to Fig. 2, where B H curves for wrought iron, cast iron, and hard steel are shown, and after what has been said their main features ought to call to your mind some of their special characteristics.

These curves are to the designer something like what the indicator curve from an engine is to an engineer—not quite that, but the parallel conveys the idea of their usefulness.

Let us examine the curves for a moment, and, without doing more than simply touching on the subject, see what they convey to us as regards the characteristics of each metal and its suitability for certain specific purposes.

*Hard Steel Curve.*—The shape of the curve suggests stubborn characteristics. The metal is exceedingly difficult to magnetise, but what is more important still, it is also very difficult to free it of

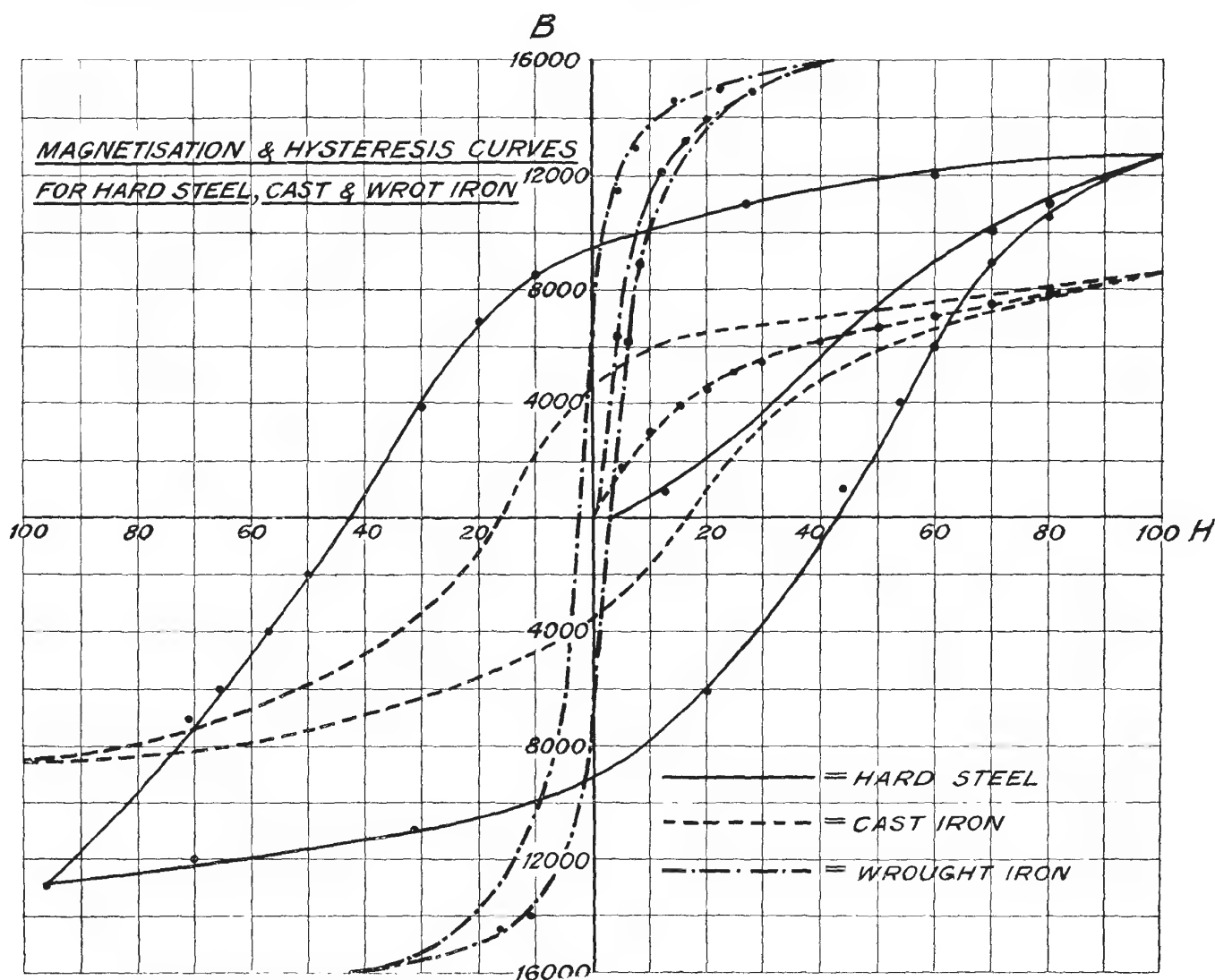


FIG. 2.

magnetism—a valuable property for permanent magnet work. There is good reason to believe that tempering is in some measure responsible for this peculiarity. As you are all well aware, when steel is being tempered it is heated to a bright red, allowed to cool till a certain colour (red, orange or straw colour) shows up on the surface of the metal, and then it is plunged into oil, hot or cold water, or mercury. The sudden cooling causes the surface of the metal to contract, so setting up severe internal pressures, which force the molecules in the mass into very intimate contact with each other. It is reasonable to suppose then that molecular friction is at its maximum, and that it will be difficult to move them out of position. That this is so is fully borne out by the B H curve.

It is interesting to note that very good magnets are made by submitting the hot metal to severe pressures in cooling, at the same time subjecting the metal to a powerful magnetising force.

**Cast Iron Curve.**—The metal shows fairly good magnetic characteristics. For ordinary magnet work, where weight and space occupied are not of first consideration, cast iron is very widely employed. Very clean castings can now be got and machining is cut down to a minimum. The metal is therefore very widely used for motor and dynamo field magnet yokes, etc.

Obviously, however, it would be folly to employ this material on alternating current apparatus on account of its high hysteresis loss, etc.

Very little, if any, cast iron is used on the magnetic circuits of telephone apparatus, always excepting, of course, the power machinery.

**Wrought Iron Curve.**—This curve indicates that in wrought iron we have a material showing all-round excellent magnetic qualities. It is very widely used in telephone work. From the core of the induction coil to the armature of the power generator every piece of iron required for magnetic purposes in the telephone exchange is wrought iron.

The curve shows us why this is so, and we note the following important features:—

- (1) Low magnetising forces produce good magnetic results.
- (2) Moderate forces give much higher magnetic results with wrought iron than with cast iron.
- (3) The hysteresis loss is low, as can be seen by the loop area being small.

(To be continued.)

# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. V.]

MARCH, 1911.

[No. 60.]

## A "TELEPHONE AUTHORITY."

At a special meeting of the London Chamber of Commerce recently held, Mr. HERBERT LAWS WEBB read a paper (which we publish in this issue) proposing an entirely new solution of the telephone problem as regards its future administration and development. As is generally known the consummation of the agreement of 1905 which will place the whole telephonic service of the country under the control of the Post Office is rapidly approaching, although we have heard alternative suggestions mooted for dealing with the question by partial or complete municipalisation or by an extension of the National Company's license. The time, however, to the end of 1911 is short and several steps in the direction of absorption by the Post Office have already been taken.

The new solution which Mr. WEBB proposes is no less than the constitution of a telephone authority (on the lines of the Port of London Authority) which would assume control of the telephone systems not only of the Company but also of the Post Office and the two municipalities whose undertakings have survived competition.

The reading of the paper was marked by murmurs of assent and the criticisms upon it by members of the Chamber were all sympathetic. It is at least refreshing to find the largest Chamber of Commerce in the kingdom more interested in the future development of this all-important service than in the telephone rates of Norway and Switzerland, which seem to exercise the minds of many of the chambers and governing bodies to the exclusion of all other considerations.

"Let the telephone flourish!" is the sincere aspiration of those enthusiastic telephone men who constitute the bulk of our readers, and any scheme bearing on the development of the great industry in which their careers are bound up must naturally come in for

discussion in these columns. The project laid before the chamber of commerce is so far-reaching in its scope and so full of the most interesting possibilities that we cannot well avoid giving them some consideration.

In the first place, such an authority as that proposed, being of semi-commercial and semi-governmental constitution, would aim at combining the merits and avoiding the defects of both *régimes*, and would at least ensure that the telephone was not only self-supporting, but that it paid its way and contributed to the revenues of the State.

For this reason it would, in the second place, more easily command that free and liberal flow of capital which we have always maintained is vital to the development of the telephone industry than could an ordinary Government Department whose finance is circumscribed by the restrictions of the Treasury.

In the third place, an enormous belated expansion of the telephone in these islands, coming like a flood bursting its artificial dam, would mean unlimited possibilities of increased employment and advancement as the industry rapidly assumed its natural and legitimate dimensions.

The suggestion also has its advantages on the score of expediency, for it would ensure the great and indisputable advantage projected by present plans—that trunk wires and all exchange systems of every description would form a homogeneous whole under one control. Moreover, the vast and complicated labours of the two Inventory staffs now proceeding would in no wise be thrown away, for while it may be a matter of indifference to the National Telephone Company who its successor is to be, the purchase price of its plant will have in any case to be fixed.

## SOME REMARKS ON VOLUME V.

THE JOURNAL has now completed its fifth volume and with the April issue will enter on its sixth year. Whether that volume will run its normal course, and whether it will be succeeded by others, are matters which lie "on the knees of the gods." At all events, it has proved its usefulness by its success, and may be claimed, as the advertiser puts it, to "fill a long-felt want." Certainly the ever-increasing circle of subscribers at home, abroad and in the colonies bears witness to its value as a telephonic as well as a staff journal. We have endeavoured to leave no branch of the telephonic art untouched, ranging from articles on problems of transmission to practical questions of pole erection and underground construction, from complicated traffic studies to general remarks on exchange supervision, from the eternal rate question to light articles of the most varied description. We have kept close watch on telephonic politics and development at home and abroad, dealt with many questions affecting the education and advancement of the staff, and our correspondence columns (always open to the discussion of all problems relating to our work) have often yielded valuable opinions and criticism. At the same time we have not omitted to record the social doings of the staff, their progress in the service and their successes in examinations and in other connections.

We are glad to say that the field of our contributions continues as wide as ever. During the past year the principal articles (excluding editorial matter) were supplied by the following centres:—Head Office between twenty and thirty contributions; London



between fifteen and twenty; Glasgow and Bristol between five and ten; Sheffield, Gloucester, Edinburgh, Liverpool, Birmingham, Nottingham, Oldham, Hull, Bath, Margate, Leicester, Chester and Maidstone under five.

There is every indication that the sixth volume will not fall behind the others in interest or range of subject, and we rely on our readers to aid us, as they have in the past, in making the JOURNAL as complete and thorough a record of British telephony as possible.

### NOTICES.

Reproductions of the portraits of Messrs. C. C. Wrote, C. W. Salmon and W. F. Taylor are now ready, and those of Messrs. J. Sinclair Terras and Alan Roberts are on order, price 6d. each. Portraits of nearly all the series of telephone men are in stock.

Binding cases for any volume of the JOURNAL are also obtainable, price 1s. 6d. each.

### HIC ET UBIQUE.

LIKE the law the telephone is long-armed. Unlike the law, happily it is not slow-footed but practically instantaneous. Two recent testimonies of its rapidity in overtaking the evil doer are the following. The first from a Wolverhampton subscriber:—

I have to thank you for your prompt attention to my telephone call from Graiseley at four o'clock on Saturday morning which enabled the police to get down to my house in time to arrest a man who was taking a particular delight in breaking my windows all round the house.

The second from Hull:—

I may add that, thanks to the telephone, we had a burglar caught here a little while ago. He had ransacked about five houses and attempted to get in ours, and the police were up in five minutes after we had rung up at three in the morning!!

BUT the "Slave of the Ring" also protects its mistress—if we may so style the operator—by swift and sudden intervention in orthodox *djinni* fashion, as a young man in Birmingham recently found to his cost. Using offensive language to an operator in the vain belief that he was protected by distance, and that his identity was safely hidden, he found himself kept in conversation by the operator while she telephoned for the police, and the result was a fine of 20s. and costs.

THE German Telephone Rates Bill is referred back to the Budget Committee. This, says the *Zeitschrift für Schwachstrom-technik*, in the present Parliamentary position means that it certainly will not come up again in the Reichstag during the remaining days of the session. As new elections are expected, the present Bill would appear to be dead.

OUR Bolton correspondent sends us the following illustration of the local idea of "improving the shining hour":—

A few of the operating and electrical staff were invited to a small party. Whilst the customary musical and other entertainments were going on and gaiety was in the ascendant, one of the electrical staff was observed to be in earnest converse with the host. One subject only, it was assumed, could be so interesting—telephones. This was Friday evening. The upshot of the conversation was that a contract was signed on the Saturday. Sunday with its calm for Christians, telephone men and others, intervened, and Monday saw an additional subscriber.

### ANIMAL FOES OF TELEGRAPH AND TELEPHONE.

(Translated from an article "Der Telegraph und die Tierwelt" in the "Zeitschrift für Post und Telegraphie," by W. H. G.)

THE length of telegraph wires in the world now reaches more than 8,000,000 km., but in uncivilised countries this victory was not easily won, and great was the number of enemies who again and again disturbed, and still disturb, newly laid wires. Not only have uncivilised peoples destroyed in blind vandalism skilfully erected plant, but the animal world also has placed some heavy difficulties in the way of extending the telegraph, and is, even to-day, not

seldom the cause of bad disturbances. An obstinate enemy of the telegraph, above all, was the elephant. A French weekly journal, which devoted an article to these animals in this connection, related how the mighty pachyderms repeatedly tore the telegraph poles out of the earth with their trunks and caused general destruction. What instinct did the elephant follow in this? Was it hatred of the unaccustomed? "The last word on man will be spoken one day," so says an old Hindu writing, "but never the last word on the elephant." But almost worse were the disturbances caused to the first lines in India by the buffalo. With lowered, threatening head he charged against the poles, and those which did not yield to the first assault succumbed to the second.

In North America the cave-dwelling animals have occasioned engineers and electricians many troubles. Especially the armadillo, the wild hare and the skunk, which make their caves at the roots of trees, chose the telegraph poles for their burrowings, delved their subterranean passages and brought about in course of time the fall of the poles. The bears in Norway were at feud with the telegraph; the humming of the wires led them to believe that the poles were the headquarters of bees, and they pursued that enticing goal. Their longing for honey gave rise to fresh destruction. But the shaggy dwellers in the forest learned by their disappointment: the number of attacks on telegraph lines decreased more and more, and eventually the humming of the wires lost its attractive power for Bruin. In Africa and Asia telegraphic wires formed an acceptable gymnastic apparatus for the apes: consequently the wires became broken and deranged, and the routes had to be continually visited to make good the sins of the apes. Most useful of all, however, has this invention of man been to the birds; they find the wires a convenient resting place, as a glance on all sides will prove.

The woodpecker certainly believed at first from the humming of the wires that the telegraph poles must harbour inside a rich booty in insects. With his pointed beak he began to tap the pole, hammering deep holes in the wood often 7 or 8 centimetres wide, but in time he also learned the fruitlessness of his labours and gave them up; he had done enough damage. In America hundreds of poles had to be replaced because the woodpecker had so hammered them that they fell victims to the first storm.

In the insect world the birth of telegraphy was apparently hailed with joy. The wild bees chose the porcelain insulators for their nests, and industriously covered the shining porcelain with a crust of dust to prevent the sun's rays from burning through and then built their nests. Spiders show a special preference for telegraph wires, and often cover the wires with their webs for hundreds of kilometres. In Japan these webs attain such proportions that they deflect the current and hinder the messages. Special officers therefore go over appointed sections to clear away these webs—a work of Sisyphus, for a few days later the industrious beasts have reconstructed the destroyed fly traps and woven new ones.

Not only on land, in the depths of ocean has telegraphy its foes. Above all there is the teredo, which penetrates the cable and in the gutta-percha covering finds a welcome change from the monotony of wood nourishment. The sawfish often causes bad disturbances when in the depths of the sea he sometimes encounters the cable. The hindrance so annoys him that he attacks the cable with his mighty saw and disturbs the line. The submarine cables do not always follow the bottom of the sea, but often stretch from one submarine hilltop to another. This the whales utilise as a convenient means of disembarassing themselves of their troublesome parasites and rub against the cables until mussels, algae and snails are rubbed off. But these submarine toilets have dangers both for the whale and the cable. Sometimes the tail of the former is enfolded in the cable and he cannot free himself. His lot is then suffocation. In July, 1873, during works of repair, several such whales were found which had been caught in the cables as in a sling, and a similar phenomenon was observed in October, 1899, on the Brazilian coast. The cable ship *Viking* tested the cable, and eventually cut it through at the place where the current was arrested. Great was the astonishment when immediately thereupon, as if impelled by some mighty power, the body of a monstrous whale came to the surface of the water. In the interior of the great fish gases had formed which could not disperse and now sent up the enormous body like an air ball.



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## LONDON AND ITS ORGANISATION.

### TRAFFIC DEPARTMENT.

By J. STIRLING, *Metropolitan Chief Accountant*, AND  
 J. F. EDMONDS, *Metropolitan Traffic Manager*.

(Concluded from page 227.)

It would be difficult to over-estimate the beneficial results which have accrued to the service from the work of the observation office since its establishment five and a half years ago. The number of observations dealt with by the central office is about 3,400 per month, and as pointers to causes of weakness or slackness at any part of the system the records taken are invaluable. The general toning up of the service by reduction of irregularities, removal of obstacles to clean operating, and the maintenance of a good average answer and clear, is largely due to systematic observation work and the reliable data which it has furnished as to lines of enquiry and progress. The supervisory staff now appreciate the value of an impartial statement of the work carried out by those they control. At a few exchanges situated at a distance from the central office, and where it would not pay to provide direct junctions, the service is sampled regularly by means of portable observation sets. In addition to the information given on the standard forms, the

observation officer reports on any features of the service which seem to him to call for alteration or investigation, and his experience is naturally of the utmost value to the traffic manager. It is doubtful whether in the past sufficient use has been made of the observation officer's special experience. That experience comes into requisition more and more daily, and many suggestions and investigations have been made with regard to a number of subjects including such matters as the observation of "B" operators' work, the tone adopted by monitors in their dealings with subscribers, the special difficulties introduced in operating by private branch exchanges, the analysis of the "No reply" trouble, and the investigation of the reasons why operators do not repeat calls in the correct manner to subscribers. At the smaller exchanges the service is sampled by two service inspectors, who tabulate the results of calls made by the subscribers in their presence.

Another, albeit more recent factor in general service improvements, is the travelling supervisor. Some time before Head Office decided to appoint these officers throughout the country the system was at work on a small scale in London. The first experiment was made as the result of a discussion on the question of recording fee-paying calls at outlying exchanges. Some ten or a dozen exchanges were picked, and a specially selected supervisor was sent round with instructions to remain in each exchange for some days, and note all that transpired, not only as regards recording, but



everything affecting the service. Her trained and observant eye noted much that was unknown before, with the result that on the conclusion of her series of visits, four permanent appointments were made. Private branch exchanges engage practically the whole of the time of two of these officers, there being at present 245 operators employed by the Company to work the switchboards at subscribers' offices. In fact, when this special supervision of private branch exchanges is considered in conjunction with the various advantages which result from having trained operators at subscribers' offices, it is a question whether the large telephone users can properly appreciate the benefits to be derived from employing the Company's operators at their offices, otherwise this number would undoubtedly be greatly augmented. Amongst the many qualities required for this special supervision work, not the least is tact in dealing with the staff whose work is to be criticised: the aim of the supervisors must always be to lead rather than drive back into ways of rectitude those who have erred from the straight path of operating regulations. That they do this with both care and discretion the results have amply proved. One other feature of this work which must not be omitted is that it keeps the outlying exchanges in touch with the central office, and removes that feeling of isolation which is so harmful in its tendencies.

The London night service is under the care of the night manager and his assistants. At the small exchanges, where subscribers are few, there is, as a rule, a resident operator, who deals with all night calls. At the largest exchanges, however, a special male staff is employed, supplemented, in some cases, by relief operators drawn from the other departments of the service, and taking duty for not more than two hours per night in alternate weeks. The ordinary night hours vary, as at some of the largest exchanges it is advisable to keep the day staff on duty up to as late an hour as practicable. Each night operator is allowed one night off per week, and to afford the requisite relief, a proportion of the night staff have a scheduled rota of exchanges at which they take relief duty. For sick and special relief work a number of the night operators are allotted to a particular exchange at which to report on duty for instructions, and they are then dispatched to the point at which their services are required. Practically all the cord repairing and routine testing is done by the night staff. The busiest night exchanges are Holborn, to which many of the newspaper offices are connected, and Gerrard, at which the needs of the West End are provided for. The great difficulties of the night service work at large exchanges are that the bulk of the traffic is so slight for the length of time service is required; that it is difficult to arrange for continuous listening on order wires; and that a small traffic spread over a large switchboard has to be dealt with. The last named is, to a great extent, mitigated by the concentration of known night-users on special positions.

Call office success owes much to the fostering care of the Traffic Department. At many of the busy railway and tube stations the Company has its own attendants, who are under the watchful eye of the exchange manager. At Piccadilly tube station there are ten boxes controlled by two attendants. The call offices at the Stock Exchange, Law Courts and Houses of Parliament are similarly controlled. The attendants do not work more than 45 hours per week, and, as several of the boxes are kept open till a late hour in the evening, a carefully thought-out plan of relief is needed to ensure promptness and avoid surplus staff. The automatic boxes at ordinary call hours cause at times some worry to the exchange staff, but not to a great extent, particularly bearing in mind that many of the callers have had little experience of a telephone, and are therefore more likely to do the wrong thing than the right. There are now 3,027 public call offices in the Metropolitan area, and as the average calling rate is steadily rising, the provision of them is evidently appreciated.

Machiavelli's doctrine that "men will always be false to you unless compelled by necessity to be true" is one which, if it applies at all to modern business life, is surely applicable only to a small minority of malcontents, such as will always be found in every community. Most business houses trust their servants and believe in their desire to give of the best they have—ability, effort, forethought—to make the business a success. In that respect an acknowledgment is due to the exchange managers for the

diligence with which they have tended their exchanges and everything appertaining to them, so that the London service might be built up on a sound and durable basis. Their duties and responsibilities have grown with the years, but they have kept pace with the new developments. Exchange management will never become an exact science; wherever the whims, caprices, complaints and mistakes of men and women have got to be reckoned with, rules are of little avail. To control while preserving the respect and confidence of his staff; to gain the goodwill of his subscribers, while not hesitating to point out mistakes on their part; to maintain a service, complaints of which are at a minimum, while keeping in touch with those points of detail in organisation and administration which enable the machine to run smoothly, are some of the chief qualities expected in an exchange manager. The rapid growth of the private branch exchange system in the last few years has, by increasing the number of staff to be provided for and supervised outside the exchanges, and by rendering necessary alterations in method at the exchanges themselves, added a new and uncertain element to the work. It has also become a settled policy in London to encourage direct dealing between the exchange manager and his subscribers regarding complaints, even to personal interviews at the subscriber's office where that seems desirable; as far as possible, the central office does not interfere in such matters, and the result has been less correspondence and more frequent local settlements.



FIG 3.—LONDON WALL REST ROOM.

The selection of supervisors is rightly regarded as of considerable moment. On them the exchange manager must rely for maintaining a high standard of service; from their ranks have to be selected those who are to fill the important post of clerk-in-charge. (A photograph of the London clerks-in-charge at exchanges of over 500 direct lines is reproduced at the top of page 256.) No little care, therefore, is bestowed upon the appointments. The recommendation comes in the first place from the exchange manager, and he is strictly enjoined only to recommend those senior operators whose merit, keenness and general suitability, quite apart from length of service, are such as to warrant promotion. No appointment is made until the nominee has been seen by the assistant traffic manager, and a probationary period of three months, including a course of lectures at the school, and a visit to the observation office, is allowed so that the exchange manager concerned may report as to whether the appointment should be made permanent. A test of fitness, embracing knowledge of "A" and "B" operating, supervising and monitorial duties, possession of initiative and ability of clear expression in reports, etc., must also be passed. The qualifications seem somewhat stringent, but in reality are not so to any operator of intelligence and observation; they have certainly resulted in the pick of the operating staff securing, as is their right, the better and more responsible posts.

The welfare and contentment of their staff must be of the



greatest moment to all employers. The visiting matron provided by the Company does much by her tactful and sympathetic visits to the homes of sick operators, her assiduous care to prevent infection when an operator or any member of her family has contracted illness, and general desire to secure happy and comfortable surroundings for the staff, to foster that spirit of loyalty which is so desirable. Her certificate is accepted in place of a doctor's in cases of minor illnesses; she keeps the responsible officers in touch with their absent staff, and in many cases interests the parents of the girls in the work of the exchange. It is notable that, with so large a staff, there has never been an epidemic of infectious ailments at any London exchange, thanks largely to the care taken in disinfecting and cleansing the premises after any case has been notified. The bright and comfortable sitting and dining-rooms provided, those at the more modern exchanges being particularly deserving of praise, also tend to promote harmonious relations; a rest period spent in pleasant surroundings is necessarily more beneficial than if passed in an atmosphere of dreariness. (Fig. 3 shows the London Wall retiring-room.) The provision of meals on the premises is likewise a great boon, as nourishing food can be got in comfort and at a price which in outside establishments would only procure an insufficient supply of what would be less wholesome and satisfying. The catering is controlled by a committee elected by the girls themselves, all the kitchen staff and utensils being provided by the Company. (The

around which Dickens has thrown the glamour of his genius in the pages of *Barnaby Rudge*. It is abundantly evident that neither interest nor variety are lacking in our work and its associations.

More and more is the point of view of the subscriber to the telephone exchange changing. At one time the operator was to him a mere piece of machinery, so long as his calls were attended to promptly, and everything went right. When the reply was not so quick as he required, she became a person who occupied her time doing crochet-work or reading novels, an irritating misconception which we find accepted in more than one modern play, but that, of



FIG. 4. GERRARD EXCHANGE KITCHEN.

Gerrard Kitchen is shown on Fig. 4.) Previous articles in the JOURNAL have dealt so fully with the London catering arrangements that tempting as the subject is, it need not be dwelt upon. By means of the Provident Club, thrift and provision for a rainy day are rendered practicable; a small weekly payment entitles to an allowance in case of illness, and the fund is then distributed at the end of the year. The membership at present is 1,410—about 60 per cent. of those eligible. The traffic staff contribute generously to the Benevolent and Hospital Saturday Funds, and some of the exchanges assist various charitable objects in other ways, as witness the Bank Exchange annual series of whist drives on behalf of charities, and the Avenue's annual tea to the poor boys and girls of the East End. Such things add that human touch which brings people closer to each other in knowledge and sympathy than many years of ordinary business relationship would ever do.

Several of the exchanges have interesting associations connected with either the buildings or the sites. "Gerrard" is built on the site of the old Pelican Club; "North" has its inscribed plate recording that Michael Faraday worshipped there when it was a Sandimianian Chapel; "Brixton" was once a Christadelphian meeting-place; and "Chigwell" (Fig. 6) is next door to the old inn

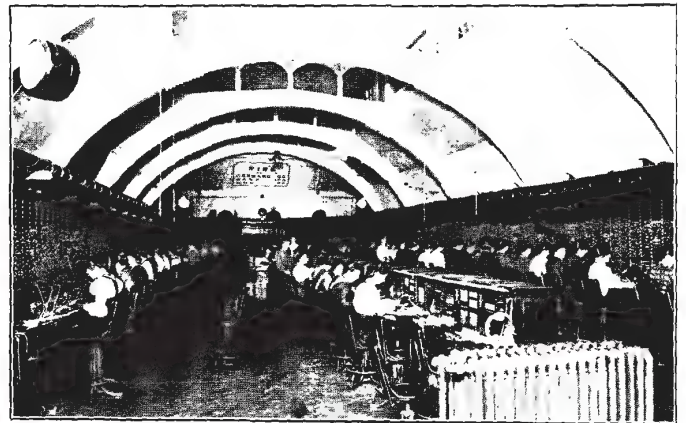


FIG. 5.—GERRARD EXCHANGE.

course, is almost to be expected, as no actor or playwright ever does seem to know how the telephone should be used—on the stage at least. At one time if a number was engaged, the operator, according to the caller, was merely saying so to annoy him, and could not possibly have found out in so short a time; if his instrument was out of order, it was the poor operator again declining to answer his call out of sheer malevolence and so on. To the average subscriber an exchange was a place where numerous



FIG. 6.—CHIGWELL EXCHANGE.

bells were constantly ringing, girls calling to each other in a loud voice, wires stretched all about the room, and a sort of general pandemonium reigning. A visit to the exchange soon dispels all these crude notions, and he realises that he is up against something bigger than he had ever dreamt of. The high pitch of organisation, the quietness with which the work is conducted, the rapidity with which calls can be dealt with and "engaged" tests obtained, the effective supervision, the high level of scientific and administrative

skill which have been reached, are to him amazing, and the impression thus made will have its reflex action in the subscriber's future attitude to his telephone service. Of course, there always will be the type of whom an exchange manager told a story recently: Having a grievance of some sort, the gentleman in question ended up by calling the operator a fool, to which she sweetly replied: "Shall I connect you to the clerk-in-charge?" "No," was the soft answer that came back, "She is a greater fool than you are." "I don't think so," courageously retorted the faithful but guileless operator. Perhaps if we cannot persuade the subscriber that he owes a duty to the Company quite as much as the Company owes one to him, we may in the near future be able to convince him that he owes a duty to himself, and that his business is bound to suffer if he does not see that the telephone requirements at his end—prompt attention, proper method of using the instruments and an adequate number of lines for his work, to mention only three—are carried out in a business-like manner.

One great difficulty in a large organisation always is to keep in touch with the staff, to see that proper instructions are given as to general policy and methods, and that such instructions are understood and carried out. Many decisions must necessarily be in writing, as they apply to all exchanges, are likely to be required for future reference, and authorise a departure from established practice. These are issued in the form of numbered circular letters, and are filed and indexed.

These instructions are supplemented by monthly meetings of exchange managers, at which questions of all kinds affecting the work are raised and discussed. These gatherings are not only of the utmost interest, but have been most useful in securing uniformity of working and the settlement of difficult and disputable matters. Each exchange manager again has regular meetings of his supervisors, at which any weakness in the exchange results is dealt with, and an effort made to find a remedy; new instructions are also talked over with a view to securing co-operation.

One thing is certain—finality in this or any other branch of the telephone business will never be reached. Traffic study and traffic work have been advanced to their proper status, and their exponents have obtained recognition of the claim to rank as the equals of other departments of telephone science. If future progress in all departments of telephone enterprise is to bear even a reasonable ratio to that of the past then the next generation will be witnesses to many marvellous achievements. Even then what rare old Izaak Walton said of angling will be true of telephone study and research: "Angling may be said to be so like the mathematics that it can never be fully learnt: at least, not so fully but that there will still be more new experiments left for the trial of other men that succeed us."

NOTE.—In the first part of this article on page 225 the number of exchanges in the County of London was given in error as 13 instead of 21.

### THE BISHOP AND THE TELEPHONE.

[The Bishop of Stepney said that he found such things as telephones, taxicabs and private secretaries, instead of enabling business men to get through more work in a given time had really the opposite effect. They had enabled a man to crowd more work into a day and made life more strenuous, swifter and harder.—Daily Press.]

THE Bishop of a hustling world makes moan;  
Shuns (Shade of Penley!) Private Secretaries  
And Taxicabs; and to the Telephone  
Disfavour carries.

The miles and minutes saved, the toil one spares  
Of being to oneself amanuensis,  
Seem to his lordship hustle-weaving snares  
Whence come offences.

But we, enjoying all those spoils of age  
And fruits of time wherewith are stocked life's larder,  
Why need we use our priceless heritage  
To make life harder?

If telephones (and other things) save time,  
Might they not spare us from the toil diurnal  
More time to meditate on the Sublime  
And the Eternal?

W. H. GUNSTON.

### TELEPHONE WOMEN.

#### LXXXVI.—ANNIE CAMERON FERGUSON.

Miss FERGUSON entered the service of the Company at the old exchange, 90, George Street, Edinburgh, in February, 1895. A canopy indicator board was in use at that time, and the switch-room was in charge of Miss Johnson, now clerk-in-charge at Edinburgh Central. That switchboard was replaced shortly afterwards by an upright hand-restoring indicator board, which remained in use until early in 1903, when the exchange was closed and the subscribers transferred to the Edinburgh Central Exchange.

Miss Ferguson had some experience of the ring-through system on lamp signals, previous to the introduction of common battery



ANNIE CAMERON FERGUSON.

working. She was promoted to be Supervisor in December, 1905. Edinburgh Central was changed to common battery working in March, 1906, so that the subject of our sketch has had experience of various systems. She remained at Edinburgh Central until her promotion as Travelling Supervisor in October, 1908.

There are 23 sub-exchanges and five private branch exchanges which come under the supervision of the travelling supervisor, so that a large area is covered by Miss Ferguson in the course of her work.

Miss Ferguson's courtesy and tact have made her popular with all grades of the service.

#### LXXXVII.—LOUISA BISHOP.

LOUISA BISHOP entered the Company's service as an operator at Tunbridge Wells in March, 1897. The switchboard then consisted of two 50-line sections, to which four similar sections were subsequently added. In 1900 the system was altered to automatic call and clear, the switchroom being removed from the ground to the first floor. At that time there was very keen competition between the Company and the Corporation (whose system was



absorbed by the Company in November, 1902), and nowhere, apparently, was the competition more pronounced than in the switchroom. It is on record that subscribers having the two systems, would make test calls over both afterwards informing the operators of the result, and it is satisfactory to know the palm was invariably given to the Company's.

Miss Bishop was promoted to be Clerk-in-Charge in August, 1903. During her thirteen years of service, all spent at Tunbridge Wells, she has served with four district and four local managers. The number of subscribers to the Tunbridge Wells Exchange in



LOUISA BISHOP.

1897 was considerably under 100; it has grown to 982. In the same period the number of sub-exchanges has increased from two to twenty, with 774 subscribers and 44 junctions.

Miss Bishop's interest in the service is wholehearted, and in her constant endeavour to maintain the operating at the highest possible pitch of excellence, she considers the interest of the Company and subscribers alike.

Miss Bishop's recreative pursuits are general, and if there are any to which she gives special place they are reading, music and lawn tennis.

### INVENTORY OF PLANT.

The following additions have been made to previous lists:—

#### HEAD OFFICE.

Edwards, D. ..	late Chief Clerk ..	Jersey.
Ewing, J. ..	Engineer ..	Warrington.
Goodman, H. ..	Assistant Engineer ..	Blackpool.
Mairs, J. ..	District Engineer and Electrician ..	Aberdeen.
McHardy, R. ..	Inspector-in-Charge ..	Berwick-on-Tweed.
Murray, J. K. ..	Assistant Engineer ..	Glasgow.
Robson, F. ..	Chief Clerk ..	Hull.
Williamson, R. ..	Local Manager ..	Newport, Mon.

#### TRAVELLING STAFF.

Quartermain, J. ..	Wireman ..	Reading.
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The following names should be deleted from previous lists:—

Stallard, E. G. ..	Enumerator.
Barker, C. G. ..	Investigation Officer.

### CORRESPONDENCE.

#### "CLERKS IN LITERATURE."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THERE are few words in the English dictionary that have as many meanings as the verb "to draw," but I suggest that the next lexicographer might, with great propriety, add this one "to quote Shakespeare or Dickens!"

In his admirable little article under the above heading in last month's issue of the JOURNAL, Mr. Gunston opened up a subject which, by this time, has no doubt appealed to and set a-thinking many of that vast body of men and women whose silent and useful work in the great commercial machinery of the world does not always meet with the recognition it deserves.

I do not propose to traverse any of Mr. Gunston's views, or to obtrude my own opinions on the social status of clerks, either in fiction or in real life. The question is too complex to be dealt with in a letter, and I will merely say this, that the public mind associates the generic and indiscriminate term "clerk" always with a man of routine and never with a thinker. Which we all know to be a colossal mistake.

But Mr. Gunston brought Dickens on the carpet and thereby, as I think he foresaw, courted criticism. The omission of a "t" in "Cratchit" was, of course, a printer's error, and, therefore, I pass it over. What I do desire is to put right what I consider a wrong done to one who was not only a great novelist, but a man of an extraordinarily broad, generous and sympathetic mind.

I do not believe that Dickens ever dreamt of casting a slur on any class of men, as a class, doing honest and useful work, no matter what their social position might be; and in this connection I might mention that in his books he runs up the whole gamut of the clerical world, from young Blight, the idle apologist of his idler master, Eugene Wrayburn, to Mr. Tite Barnacle, of the Circumlocution Office. I do not think that the many clerks he introduces into his books were intended to be types of a class, but types of men and character, and that their occupation was incidental. They are no more typical of clerks, as clerks, than Mr. Bounderby is typical of the self-made man, or Sampson Brass of the lawyer, or Pumblechook of the corn chandler, or Bradley Headstone of the schoolmaster, or Mr. Podsnap of the wealthy merchant, and a host of others.

Of Mr. Gunston's four examples, three were lawyers' clerks, two of whom were undeniably good men of business, particularly, perhaps, the "young man of the name of Guppy"; otherwise "Conversation" Kenge, his employer, would not have made him a present of his articles. Of Dick Swiveller, the impecunious ne'er-do-well, "Perpetual Grand" of the "Glorious Apollos" and champion of the little "Marchioness," it can only be said that he was no clerk, merely a needy borrower and consumer of huge quantities of beer. The pathetic figure of Scrooge's clerk, Bob Cratchit, whose weekly wage consisted of fifteen copies of his own name, was merely created to emphasise the monumental meanness of his employer.

And even in the higher walks Dickens casts no reflections on the abilities of the clerical characters he presents to us. The light and airy Tite Barnacle was merely the victim of red tape, while the Hank of England clerk who peeled and ate three Ribstone Pippins while Tony Weller signed his name may be cited as a model of unruffled and philosophic patience.

Uriah Heep and Smallweed are among the very few, if not the only, clerks who appear in Dickens' works in an unfavourable light, and even their capabilities cannot be impugned. For sheer incapacity I can only call to mind the young gentleman (name unknown) in the House of "Dombey & Son," who was under perpetual notice to leave on account of his lapses in arithmetic. But even he had his redeeming point, as when he burst forth into a passionate speech at a convivial meeting occasioned by a domestic calamity which had befallen the Head of the Firm.

But there are two who stand out as types of the best of their order—Wemmick, the go-between of Jaggers, the Old Bailey lawyer, and his criminal clients, the possessor of an aged parent in his freehold castle at Walworth; and, above all, old Tim Linkinwater, the confidential clerk of the philanthropic Cheeryble Bros. Like most of Dickens' characters, and like many of us, these two had their whimsical sides, but they were sound men of business, and had they been knights or bishops, instead of pawns in the game, who will say they would have been happier or more useful?

Head Office, Feb.

EUSTACE HARE.

### THE CALCULUS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THERE must be many members of the staff whose mathematical training was cut short on their entry into business-life before they had mastered the calculus. Some of these may have had a desire to continue their studies at home, and have found the difficulties of the calculus insurmountable. Let all such take heart, for a book has recently been published called *Calculus Made Easy* (Macmillan & Company), which will clear up most of the difficulties that beset the beginner. The prologue of this book is worth giving in its entirety; it runs as follows:—

Considering how many fools can calculate, it is surprising that it should be thought either a difficult or a tedious task for any other fool to learn how to master the same tricks.

Some calculus tricks are quite easy. Some are enormously difficult. The fools who write the text books of advanced mathematics—and they are mostly clever fools—seldom take the trouble to show you how easy the easy calculations are. On the contrary, they seem to desire to impress you with their tremendous cleverness by going about it in the most difficult way. Being myself a remarkably stupid fellow, I have had to unteach myself the difficulties, and now beg to present to my fellow-fools the parts that are not hard. Master these thoroughly and the rest will follow. What one fool can do another can.



A very clear general conception of the principles and application of the calculus follows this unique introduction. The obvious criticisms which will spring to the mouths of those who have had the advantage of orthodox instruction are best answered by the author's epilogue and apologue. I will leave critics to look these up themselves. The cost of the book is 2s. nett. A useful book to follow the one already referred to is *Barker's Graphical Calculus* (Longmans, Green & Company). Possibly after this the student may revert to the ordinary text books with some hope of grasping their intricacies.

Salisbury House, London, Feb. 13.

"EPSILON."

#### HOTEL WIRING.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

As one possessing some slight acquaintance with the wiring of large hotels and buildings, I found Mr. F. Barr's illustrated notes in the February JOURNAL relative to the plan adopted at the Sheffield Grand Hotel of considerable interest.

Presumably the building in question is not of recent construction, but, apart from this, although one frequently has to resort to the practice from motives of expediency, there is always a feeling at the back of my mind that the running of loose (mechanically) unprotected wires beneath flooring is not compatible with a sound wiring standard, particularly when, as in this case, the installation be one of some magnitude. One other count. If it is permissible to ignore possible danger to such circuits by other contractors at some future period (I am not sure it is), there is always the maintenance factor and the difficulty generally experienced—certainly in a London hotel—when it becomes necessary to upset the internal economy of such an establishment by pulling up corridor carpets to reach floor traps. Possibly this criticism is a little ungenerous, made as it is without knowledge of the building or local circumstances. Mr. Barr's scheme of main distribution, together with the wiring cost per station, exclusive of switchboard cabling cost, would be of value to many occasionally faced with the problem how best to wire a large hotel, if he would be kind enough to give them.

London, Feb. 3.

A. C. GREENING.

#### THE LAST STAFF DINNER.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I BEG leave to make the suggestion that on Dec. 30 next—the last secular day of the Company's license—some social gathering of the staff might well take place in London in celebration of a time of considerable interest to us all.

I think a dinner on that last Saturday evening would be generally welcome, as in many ways it might be made unique and might be specially arranged so as to afford a means of a semi-formal leave-taking between those who are taken and those who are left.

Leave-takings are not the most encouraging affairs in the world, especially when one bids adieu to those known over long years, and for whom, consciously or unconsciously, an affectionate regard has grown up; but this leave-taking would surely be possible under much more pleasant conditions than if it were left for official hours.

It would be interesting to see in your columns some representative opinions on this subject.

Perhaps it might be thought that a staff dinner in the spring or early summer and another in December of the same year would be too much to arrange; if this were so, might it not be worth while to defer our staff dinner until the "last day," which we would hope, however much we may regret the event, would be one of neither wrath nor mourning.

Feb. 14.

VILLEIN.

#### LONDON NOTES.

The fourth annual Christmas treat was given by the staff of the Avenue Exchange to some of the poor children of Stepney on Jan. 21 at the Stepney Tabernacle. On this occasion 500 children assembled, and there could be no mistake about the success of the entertainment, the excellent tea, the gaily decorated tables, the varied assortment of cakes and other dainties, and the cinematograph show which followed, all being highly appreciated by the large company of small people. Not the least enjoyable part of the programme was the concert which concluded it, and which was provided by the children themselves; indeed, from the point of view of the helpers and visitors, it proved most interesting, the quick humour and cockney assurance of these juvenile comedians being quite amazing. We must congratulate Miss Forge (the "Avenue" Clerk-in-Charge) and her kindly staff, not only for finding the energy for this truly charitable undertaking, but on getting together the funds necessary to carry it out.

FOLLOWING the excellent example of "Avenue," the "London Wall" operators gave a tea and entertainment to 200 poor children at Lees Hall, Canning Town, E. The Mansfield House Settlement authorities selected the children, and the poverty of the neighbourhood was illustrated somewhat pathetically by the lack of boots and shoes on the feet of many of the small guests. There were numerous willing hands to assist in dispensing the tea and various good things which accompanied it, the enjoyment of the helpers being only second to that of those they served. The fact that in several cases the ample *men* allowed for one or two tit-bits being stored in pockets for home consumption was not the least appreciated feature of the entertainment. Afterwards living marionettes, a magic lantern and a conjuror added their alluring performances to the afternoon's enjoyment, and the closing gift to each child of a toy, a new penny, an apple, an orange, and a bag of sweets was an ending such as they had not dreamed of. Miss Butcher (the Clerk-in-Charge) and her staff proved wonderful organisers, and one certainly hopes that the desire of the donors to make their treat to the children an annual one may be realised.

THE reports submitted to the Benevolent Society's annual meeting on Jan. 26 showed that during 1910 the need for the society had been more than justified, and much timely help given to members of the staff who had found themselves unfortunately in straitened circumstances. Mr. D. Stuart (Head Office), chairman of the committee, presided over the meeting. Mr. Clay, whose health did not permit of him being present, has again undertaken the president's duties, and a number of the chief officers have consented to become vice-presidents. The total membership at the end of 1910 was 2,828, being an increase of 128 for the year. One feature of the figures capable of improvement is the small proportion of the outside engineering staff who are members; the fact that the largest grant goes to and the smallest revenue comes from that department ought to lead to an increased membership. The amount disbursed by the society since its formation now exceeds £1,000. The Company's contribution for last year was £130 7s. 5d.

Two of the City contract officers—Mr. G. Holder and Mr. W. Quash—have recently resigned, the former to take up a position in Australia, and the latter to accept a post in a shipbroker's office. Mr. Holder was the recipient of a safety razor and fountain pen from his colleagues, and Mr. Quash was presented with an umbrella. Good wishes accompany both to their new spheres.

ANOTHER of the "Bank" Exchange successful whist drives was held at "Ye Mecca," Ludgate Hill, on Jan. 25. The guests numbered 186. The organisers are to be congratulated that both socially and financially the results were admirable; the latter aspect is especially gratifying as the Benevolent Society's funds benefit to the extent of £5. The prizes were mostly given by friends, and were presented to the winners by Mr. Edmonds.

WHEN Mr. W. H. Elkington, a City contract officer, died a month or two ago, Mr. Bigland, the City contract agent, knowing that Mrs. Elkington's resources had been very much strained by her husband's illness, collected a sum of nearly £6 amongst sympathising members of the staff. This has been paid over to Mrs. Elkington in weekly instalments, and she has asked Mr. Bigland to convey her gratitude to the subscribers.

Mr. B. S. COHEN, Chief of the Investigation Department, read a very instructive paper to a well-attended meeting of the London Telephone Society on Feb. 6. He touched on a number of important matters dealt with by his department. The various forms which have been designed in connection with the enormous task of standardising the Company's junction circuits, etc., were fully explained, the explanation being assisted by the aid of lantern slides. Apparatus for making transmission tests in and out of the laboratory was referred to, and a number of telephone freaks in the form of patent attachments for mouthpieces was shown. One providing for the accommodation of the speaker's nose as well as his mouth in the mouthpiece (an American invention) caused considerable amusement. The paper concluded with some particulars regarding loading problems. A brisk discussion followed which was limited by time and not speakers.

At the monthly meeting of the Operators' Society, on Monday, Feb. 13, the varied programme attracted an audience of 234 members. Five papers were read, each being followed by a short discussion, and it will be seen from the titles given that the subjects covered a wide field. They were respectively, "Some Details of Operating," by Miss M. Clayton (Supervisor); "The Duties of a Senior Operator," by Miss E. Knowling (Operator); "The Value of Local Observations," by Miss A. G. Buckwell (Clerk-in-Charge); "The Importance of Tone and Manner," by Miss M. Bennett (Operator); and "Bartholomew House," by Mr. P. J. Mantle (Exchange Manager). The plan of replacing the usual one or two longer papers by several brief and "crisp" discussions was expected to encourage a larger number of debaters, but did not apparently have that effect, the speakers being fewer than usual. Many interesting points were, however, raised. The result of the "competition" evening, which was announced at intervals in quite the most approved "modern advertising" style on the screen, will be looked forward to with interest.

DURING February very enjoyable "socials" were held by the traffic staff of "London Wall" and "East." The former was at the Bishopsgate Institute; there was a gathering of over 200, who thoroughly enjoyed the programme of songs, recitations and dances provided for them. Miss Berry, the Senior Supervisor, assisted by a committee of operators, was responsible for the arrangements. The "East" staff had also an attendance of about 200 at Limehouse Town Hall, Mr. Tattersall being in the chair. A well-patronised buffet was provided, and there was an excellent programme of songs and recitations, relieved by games and dancing. The most successful event on the programme was the performance of a toy symphony orchestra under the charge of Miss Mott.

IN the semi-final of the Clay Challenge Cup, Head Office met South-East on Feb. 11, the result being a draw of four all. The re-play, as well as the match between Salisbury House and City, must be decided not later than Feb. 25, and the final must then be played by the last Saturday in March.

#### STAFF GATHERINGS AND SPORTS.

**Greenock.**—The annual dance of the staff was held in the Tontine Hotel, Greenock, on Jan. 27, at which 80 members of the staff and their friends were present, including Mr. A. Ramsay Lamb (District Manager) and Mrs. Lamb. Dancing was carried on till 2 a.m. Messrs. Bucklitsch and Lowe acted as M.C.'s.

The Post Office and National Telephone Company employees held a joint *conversazione* in the saloon of the Town Hall last month. Mr. J. MacIntyre, Postmaster, presided over a large attendance, and was supported by Messrs. J. L. Macdonald, chief Post Office Surveyor for the South of Scotland; D. Millar, late Greenock Postmaster; A. Ramsay Lamb, District Manager of the



National Telephone Company; Mrs. Lamb, Messrs. J. A. Swanson, A. Wilson, A. Bucklitch, R. Whyte, J. Lennox, T. M'Iver and J. Bulloch. After tea an excellent programme of songs was submitted by Misses Cathie, Brown and Mearns and Messrs. MacDougall, Pirrie and MacDonnell, Mr. L. T. Sharp acting as accompanist. At the conclusion of the musical programme dancing was engaged in. The arrangements for the *conversations* and dance were in the hands of a joint committee, with Mr. J. Lennox, of the Post Office Telegraph Department, as secretary.

**Bath.**—A social gathering, at which the majority of the centre staff were present and heartily enjoyed themselves, was held on Jan. 27. The "Hearts" prizes were won by Miss E. Allen, Miss I. A. Garlick and Mr. E. E. Lea. The details of the arrangements were carried out by Miss A. F. Weeks and Messrs. T. O'C. Parnell and W. A. Taylor.

**Edinburgh.**—The annual staff dance was held on Feb. 1 in Aitchison's Rooms, Queen Street, the company numbering upwards of a hundred. To the members of the committee great praise is due for the able manner in which the arrangements were carried out. Messrs. Bald and Tait performed the duties of M.C.'s.

**Cardiff.**—The members of the Cardiff Operators' Thrift Club held a social evening on Jan. 20 at the Queen's Café. Singing and whist were indulged in, and thanks are due to the Misses Brimble, Church, Clargo, Merritt and Thorn, and Mr. Mees for the musical part of the programme. The whist prizes, which were presented by Mrs. W. J. Marsh, were secured by the following:—Ladies: first, Miss Coates; second, Miss Baugh and Miss Church (prize divided); consolation prize, Miss H. van Riel. Gentlemen: first, Mr. Prickett; second, Mr. C. Osborne; consolation prize, Mr. Ryland. The main object of the gathering was to make a small presentation to Mr. W. J. Marsh (Traffic Manager), as a memento of the time spent by him as Exchange Manager of the Cardiff Exchange, and as a mark of the esteem in which he is held by the Cardiff operating staff. The presentation, which was made by Miss Spearing (Clerk-in-Charge), consisted of a pair of gold sleeve-links. The opportunity was also taken of presenting the secretary of the Thrift Club, Miss B. W. Williams, with a signet ring, as a token of appreciation of the work done by her during the last six years, in which she has acted as either secretary or auditor. The presentation was made by Mr. Marsh, who gave a short *résumé* of the good work done by the club during its existence, and thanked Miss Williams for the valuable services rendered by her. Mr. Ryland acted as M.C.

**Luton.**—A very enjoyable time was spent on the evening of Jan. 28, when about 60 members of the staff and friends met at the Franklin Restaurant, Luton, on the occasion of the annual social. A very interesting programme had been prepared, and included the special engagement of an elocutionist. A large number of musical items were given by members of the staff.

**Newport, Mon.**—The Newport staff held a social evening at the Beaufort Café on Jan. 26, when about 50 of the staff and friends were present. A very enjoyable evening was spent, the programme including various games and many interesting competitions, which were very keenly contested. In the absence of Mr. Williamson, Local Manager, who has been transferred to the Inventory (Headquarters) staff, Mrs. Williamson distributed the prizes. The committee consisted of Miss Van Riel (Clerk-in-Charge), Miss Turner, Mr. E. G. Payne, Mr. R. W. Richards and Mr. Turner. Mr. N. E. Davis acted as hon. secretary.

**Norwich.**—On Feb. 11 the Yarmouth staff and friends visited Norwich to try conclusions in a return football match with the Norwich staff at Eaton. The match was played under severe climatic conditions, the proceedings receiving the unsolicited assistance of rain, snow and blizzard in varied proportions. The result was in favour of Yarmouth, who, by four goals to three, regained possession of the Megohm Cup, captured by Norwich earlier in the season. A highly successful tea and musical evening ensued at the Criterion Restaurant, when the Megohm Cup was duly presented to Mr. Wilton, captain of the winning team. Reference was made by several speakers to the social value of these staff gatherings, and a wish expressed that the same staffs may arrange friendly cricket matches during the coming summer. During the evening the District Manager (Mr. O. W. Stevens) joined the party, and was accorded a vociferous reception.

**Dundee.**—The centre staff and friends held their annual dance on Jan. 20 in Gray's Rooms, Dundee. Under the guidance of Mr. A. G. Dundas, assisted by the committee, a company numbering about 40 couples participated, and the dance was thoroughly enjoyed by all present.

**Dover.**—The staff of the centre, with members of the Inventory staff and friends, held a very successful whist drive and dance at the Grand Hotel, Dover, on Feb. 3. The drive lasted from 8.30 to 11 o'clock. The ladies prize, a travelling clock, presented by Mr. C. F. Ashby, District Manager, was won by Miss G. Gregory, Correspondence Clerk of the district office, and Mr. G. Baker, Contract Officer, Folkestone, gained the gentlemen's prize, a pipe in case, presented by Mr. F. Duerth, Local Manager, Dover. Dancing was then indulged in till the early hours, whilst those not dancing found diversion in games and songs. The company dispersed about 1.30 a.m., having had a thoroughly enjoyable evening. The duties of M.C. were ably carried out by Mr. J. U. Wood.

**Hull.**—A very enjoyable evening was spent by the staff and friends, numbering 200, at a smoking concert, organised by the local members of the A.S.T.E., which was held at the Imperial Hotel on Jan. 27. An invitation was given to the new District Manager, Mr. J. W. Swithinbank, and this opportunity was taken to welcome him to the East Yorkshire district. Mr. Swithinbank was introduced by the Contract Manager (Mr. A. K. Murray) in a short speech, extending to him the same loyalty as was given to his predecessor, Mr. C. C. Worté; to which Mr. Swithinbank suitably replied. Items from the programme included songs by the Misses Annie Croft, Filby and Murray, Messrs. G. Gibb McLaughlin, G. R. Hill, A. K. Murray, J. Galt and C. Rudston; also violin solos by Mr. Harvey.

**Sheffield.**—A very successful whist drive and social gathering was held at the Baths Hall, on Feb. 3, over 100 members of the district and Inventory staffs with friends being present. Owing to the excellence of the programme

and the encores accorded to the various artists, it was only possible to play fourteen games at whist, for which five handsome prizes were given. The District Manager (Mr. R. C. Bennett) presided over the entertainment and also presented the prizes.

### NEWS OF THE STAFF.

Mr. J. RILEY, Local Manager, Barry, has been appointed Local Manager, Pontypridd, vice Mr. J. W. Price, deceased.

Mr. R. WILLIAMSON, Local Manager, Newport, has been transferred to Headquarters Inventory staff. Mr. G. FIELD, Exchange Inspector, Cardiff, has been appointed Acting Local Manager during Mr. Williamson's absence.

Inspector THOMAS S. HAUGHTON, Cork, has been transferred to Dublin in the same capacity. Before leaving he was presented by the Cork staff with a suit case.

Mr. W. A. FRAME, Traffic Manager, Greenock, on resigning from the Company's service to go abroad, was presented with a sum of money and a fountain pen.

Mr. L. G. ALLEN has been appointed Exchange Manager at Dublin Central Exchange.

Mr. PETER GILMOUR, Instrument Fitter, was, on the occasion of his leaving the service, presented with a kit bag and suit case. He sailed for Cape Town on Feb. 16 to fill a Government appointment as switchboard fitter.

Mr. S. A. HARDSTONE, of the Engineer-in-Chief's Department, has been awarded a Territorial Force efficiency medal, having completed twelve years in the Electrical Engineers' and London Wireless Telegraph Companies (R.E.).

Faultsman H. BINNS, Harrogate, has been transferred to South Shields as Chief Foreman.

Mr. S. G. TREGILLUS has been transferred from the position of Stores Clerk, Plymouth to be Local Office Clerk, Truro.

Mr. A. H. MANSFIELD has been transferred from the position of Local Office Clerk, Truro, to be Storekeeper, Plymouth.

Mr. F. R. W. WORDEN has been appointed Stores Clerk, Plymouth.

### METROPOLITAN STAFF CHANGES.

Mr. R. H. CHAFFIN, Wayleave Officer, Croydon, to be Call Office Collector, Salisbury House.

Miss A. M. B. HILTON, Operator, Hop, to be Clerk (Rentals Department), Salisbury House.

Mr. J. E. MARSHALL, Fitting Inspector, South, to be Chief Inspector, South.

Mr. F. LYNCH, City Fitting Department, to be Test Clerk, Holborn.

Mr. E. GREGSON, Inspector, Paddington, to be Test Clerk, Bank.

Mr. H. POUNTNEY, Test Clerk, Holborn, to be Exchange Manager's Assistant, Avenue.

Mr. R. W. WARE, Clerk in Superintendent's Office, to be Test Clerk, Paddington.

Mr. E. B. BOUCHER, Test Clerk, Bank, to be Exchange Manager's Assistant, London Wall. He was presented with a silver-mounted umbrella by former colleagues.

Mr. H. MORGAN, Contract Officer, Dalston, to be Chief Clerk, Contract Department, Dalston.

Mr. W. SEARLE, Foreman, Gerrard, promoted to be Acting Walking Foreman, East.

Mr. W. J. STROUD, Night Watchman Inspector, North, to be Test Clerk, North.

Mr. C. W. NAUGHTIN, Chief Inspector, Dalston, to be Chief Inspector, Gerrard.

### Traffic Department.

Miss MAUDE BLAKESLEY, sen., Supervisor-in-Charge, Croydon, promoted to be Clerk-in-Charge.

Miss ELLEN MOBLEY, Supervisor, London Wall, promoted to be Senior Supervisor-in-Charge, Palmers Green.

Miss MINNIE FRYERS, Operator, Bank, promoted to be Supervisor-in-Charge, Waltham Cross.

Miss ADA KNAPMAN, Clerk-in-Charge, North, transferred to Brixton.

Miss CELIA HOOPER, Clerk-in-Charge, Brixton, transferred to North.

Miss GERTRUDE RYDER, Supervisor-in-Charge, Palmers Green, transferred to London Wall as Supervisor.

Miss ETHEL BRASH, Supervisor, London Wall, transferred to East.

Miss HENRIETTA EVANS, Supervisor, East, transferred to London Wall.

### MARRIAGES.

Mr. A. LYNN, Chief Clerk, Cork, who has been transferred to the Head Office Inventory staff, was on the occasion of his approaching marriage, presented by the South of Ireland staff with a canteen of cutlery and week-end bag. Mr. Cowley, Superintendent for Ireland, made the presentation, in the absence of the District Manager.

Miss ISABELLA WILLSON, of the Great Yarmouth operating staff, has resigned from the Company's service to be married, and on leaving was presented with a handsome tea service and cheese dish by Mr. J. D. Pugh, local manager on behalf of the Great Yarmouth, Lowestoft and Gorleston staffs. Miss Willson was also the recipient of a china fruit bowl, an oak tea tray, and other presents from individual members of the operating staff.

Miss IVY STEELE, who has been in the Company's service at Harrogate since April, 1907, left on Dec. 24 to be married to Mr. A. WILLIAMS, who is himself a member of the staff at Harrogate. They were co-jointly presented with a pair of pictures and set of fire brasses by the Harrogate staff.

Mr. FRANK STEVENS, Sub-Engineer, Swansea, at present on the Inventory staff, was presented by the other members of "O" division, with a travelling trunk, on the occasion of his marriage to Miss MAY HAGLEY, formerly of the Company's service in Bristol.

At the close of the Bristol Operators Society meeting, Feb. 16, Mr. A. Perkins, on behalf of the operating staff, presented Misses LUCY MARY



SHELBOURNE and MARY ELFRIDA CAMERON, Operators, Bristol, with a leather hat box and cut-glass rose bowl respectively, as marks of esteem, on the occasion of their leaving the Company's service to be married. Miss Shelbourne is leaving England for Buenos Aires on Feb. 28, where she is to be married to Mr. A. H. KINGSCOTE, who was formerly sub-engineer with the Company at Bristol, and who left in October, 1909, to take up an appointment on the Engineer-in-Chief's staff of the United River Plate Telephone Company at Buenos Aires.

#### OBITUARY.

We regret to announce the death on Thursday, Feb. 9, of Mrs. COCKBURN, who acted as Operator and Caretaker at the Company's Gourrock Exchange. The deceased lady, who was the first operator when the exchange was opened in Gourrock during 1897, was very popular with the staff and subscribers, her obliging and courteous manner winning for her many friends. The funeral was private, and the staff sent a floral wreath.

#### LOCAL TELEPHONE SOCIETIES.

**Bath.**—The fifth meeting was held on Feb. 1, Mr. W. C. Owen giving an extremely interesting paper entitled "Reminiscences," introducing a number of well-known names in the service in the course of describing his telephone experiences in various parts of the United Kingdom.

**Birmingham Operators.**—The fifth meeting of the session was held on Feb. 9, Mr. M. Bowes of the traffic office being in the chair. Seven competition papers on the following subjects were sent in by members:—"Scraps from the Monitors' Table," "Standard Expressions," "C.B. Order Wire Working," "Hints on 'A' Operating," "After Hours' Duties," "Exchange Messengers' Duties," and "Ambition." Some of the papers were sent in under a *nom de plume* and read by Mr. Abbott, Central Exchange Manager, others being read by the writers. The papers were of exceptional interest and merit. Messrs. Barr, Roberts and Jones of the Inventory staff kindly consented to act as judges of the papers and their decision will be published later.

**Bolton.**—A meeting on Jan. 17 was addressed by Mr. G. S. Wallace, Chief Electrician, Manchester, the subject being "Change-over from Magneto Working to C.B. Working." The various stages in the change-over at the City Exchange were dealt with by Mr. Wallace most thoroughly, and a subject of peculiar interest to the Bolton staff was made clear by means of excellent slides, curves and tabulated figures. A discussion followed the lecture.

On Feb. 16 Mr. T. A. Prout, Assistant Provincial Superintendent, gave a lecture on "Education, Method and Organisation." Mr. Prout made his subject fascinating by variety of illustration, verbal and graphic. Comparisons of telephone and railway organisation and other undertakings, together with brief analyses of the methods of the more prominent men associated with the undertakings, packed his lecture with interest. The evening ended with an excellent little concert by the members.

**Bournemouth.**—The third meeting was held on Jan. 19, when there was a good attendance of members to hear Mr. B. Clayton, Cost Clerk, Southampton, give his paper on "The Statistical Department." The paper was a most thoughtful and interesting one, and was discussed with much animation, the many enquiries addressed to the lecturer being answered satisfactorily. The chair was taken by Mr. L. Hunt, the Contract Agent.

The fourth meeting of the session was held on Feb. 8 before a very good attendance. The chairman, Mr. L. Hunt, was also supported by the District Manager, Mr. W. Howe, and the Acting Local Manager, Mr. W. G. Moore. The lecturer, Mr. H. O. Newman, of Head Office, gave a most interesting and lucid explanation on the process of boiling out joints. A discussion followed, in which Messrs. Young, Harris, Moore and others took part.

**Bristol.**—At the meeting held on Feb. 16, Mr. C. J. Williams, formerly of Bristol, but now Chief Clerk of Exeter, read a paper on "Engineering Records" before an attendance of 54 per cent. of the members. His paper described every record kept in the Engineers' Office, and being of a purely descriptive and not in any way of a controversial nature, it did not offer much opportunity for a lengthy discussion. The Engineer, Mr. E. L. Preston, presided.

**Bristol Operators.**—The third sessional meeting was held on Jan. 19 when a lecture was delivered by Mr. A. E. Coombs, Traffic Manager, Bristol, on "The Reason Why." Mr. Coombs emphasised the importance of understanding why certain things were done, and of not merely carrying out rules simply because they were rules, but of understanding the spirit as well as the letter. Amongst other things "The reasons why" of the operating statistics, weekly register readings, expressions, repetition of exchange names and numbers, society meetings, etc., were dealt with. Mr. Alfred Perkins (District Manager) presided.

The fifth sessional meeting was held at Bristol on Feb. 16, when Miss F. P. Nicholls, Clerk-in-Charge, Bristol, read a paper on "Divisional Working." Miss Nicholls outlined the importance of this phase of operating and commented on the improvements it had brought about, notably the increased sense of responsibility on the part of the supervising staff. The staff in the subsequent discussion corroborated Miss Nicholls' statement that the modern divisional arrangement was of great advantage and an improvement on anything yet introduced. Mr. A. Perkins (District Manager) presided.

**Cardiff.**—The fourth meeting was held on Jan. 26, Mr. S. F. Whetton being in the chair. There was a good number present. This night was set apart for competitive papers on "Office Work." The first prize was awarded to Mr. G. D. Bateman for a paper on "Directory Work"; second prize to Mr. H. N. Garland for a paper on "Wayleaves," and the third prize to Mr. G. R. Woodworth for a paper on "Cash." A lively discussion followed.

The fifth meeting of the session was held at Cardiff on Feb. 9, Mr. S. F. Whetton being in the chair. There was a good attendance. This was a competitive night open to instrument and line staff for papers on "Incidents in Connection with the Transfer." The first and second prizes were pooled and divided between Inspector E. Reid and Foreman E. Smith. An interesting discussion followed.

**Cardiff Operators.**—The third meeting of the session was held on Feb. 14,

and took the form of a competitive night. The chair was taken by Miss Spearing, Clerk-in-charge. Mr. Williamson, the chairman, has recently joined the Inventory staff, and was therefore unable to be present. Five papers were read by the following members:—Miss D. F. Lyons, "What Constitutes a Good Service"; Miss W. M. Baugh, "Telephone Mannerism"; Miss L. Evans, "Sub-Exchange Working"; Miss G. M. Hockey, "Junction Working"; and Miss G. H. Vaughan, "Local Knowledge." The papers were all of a very high standard, and it was clear that they had not been written without a considerable amount of thought. The vice-presidents, clerk-in-charge, and supervisors adjudicated, and awarded the first prize to Miss Lyons, second prize to Miss L. Evans, and third prize to Miss Vaughan. After a short discussion the meeting was brought to a close.

**Cheltenham.**—The third meeting of the session, postponed from Dec. 29, was held on Jan. 27, when Mr. A. R. Wran gave a paper on "Faults" and Mr. F. C. Henderson on "Primary Batteries."

**Cork.**—At the fourth meeting held on Jan. 26, Mr. W. Patterson read a paper on "The Rental Register and the Work it Involves." The paper was clear and to the point throughout; it was both instructive and interesting in a high degree and the blackboard was freely and effectively used to elucidate various points touched upon. At the close various remarks were passed by Messrs. Haughton, Lynn, Chamney, Hay and Roy.

**Cornwall.**—A meeting was held at Truro on Dec. 22, when Mr. A. H. Mansfield read a paper entitled "The Centre." The reader illustrated his paper with lantern slides. Mr. G. Hooper, president, occupied the chair. There was 94.11 per cent. of the members present.

The third meeting was held at Truro on Jan. 11 two papers being read, one by Mr. E. Beare, Penzance, entitled "The Maintenance of Small Exchanges," and one by Mr. R. Harris on "Details in Line Work." The president again occupied the chair and 94 per cent. of members were present.

**Coventry.**—On Jan. 13 Miss Adams, of Birmingham, read a paper on "Telephone Progress from an Operating Standpoint." The paper was full of interest and created an excellent discussion which lasted over an hour. Fourteen members of the Inventory staff were present, and of these several took part in the discussion.

Mr. J. R. Milnes of the Engineer-in-Chief's Department gave a very interesting lantern lecture on "Power Plant" before the society on Feb. 13. Mr. Mewburn, the District Manager, was in the chair. The lecture was much appreciated, containing as it did a great deal of information which will be helpful to the members of the local staff, especially those who have charge of accumulators and motors.

**Dundee.**—At the meeting held on Jan. 25, a paper was read by Mr. John McEwan on "Switchboard Construction." The writer included much practical information, and gave an interesting description of a change-over from earth to metallic circuit.

The usual monthly meeting was held in the University College on Feb. 14, when Mr. Napier, of Head Office, gave a lecture on "Traffic." The lecture proved most interesting, and was greatly appreciated by an audience of record numbers. Mr. W. Brown, District Manager, presided, and expressed the thanks of the meeting to the lecturer.

**Edinburgh.**—The fourth meeting of the session was held on Feb. 6, when Mr. Wrote, District Manager, delivered a lecture entitled "Post Office Trunk Switchboards." During his lecture he described the course of a trunk call from the time of its initiation until it was effected at the distant end; each step in the progress of the call being illustrated with lantern slides. He also showed the internal connections and multiple switchboards by means of a large number of slides. The lecture, which was greatly appreciated, was attended by a large number of the staff.

**Exeter.**—On Jan. 31 a paper was read by Mr. W. F. Wilson, entitled "Details of Line Work." The paper was particularly interesting to the outside staff, and was full of original points dealing with methods of construction. There was a good attendance.

**Gloucester.**—The fourth meeting of the session took place on Feb. 15, Mr. C. Elliott, District Manager, occupying the chair. An excellent paper was given by Mr. H. B. Yeo, Stroud, entitled "Telephone Instruments, their Construction and Working," which was ably explained by means of an instrument taken to pieces and by diagrams. There was a record attendance, and a number of guests, including Mr. Waite.

**Greenock.**—The fourth meeting of the session was held on Jan. 19. The subject was "The Telephone Business," and was illustrated by lantern slides. The slides dealt mainly with the technical side, and were explained by Mr. A. Wilson, Electrician. Mr. A. Ramsay Lamb occupied the chair.

The fifth meeting of the society was held on Feb. 2, and took the form of a whist drive. The prizes were kindly presented by Mr. and Mrs. A. Ramsay Lamb. Miss Kennedy won the first prize for ladies, and Mr. A. Wilson, Electrician, won the first prize for gentlemen.

**Hastings and Eastbourne.**—A meeting was held at Hastings on Jan. 23, when Mr. E. Brickett, of Hastings, gave a very interesting paper on "Electrical Instruments, and How to Use Them." Mr. T. J. Hickmore was in the chair.

The third meeting was held at Eastbourne on Jan. 30, when a very interesting paper on "Traffic" was read by Mr. F. J. Frost, Traffic Manager.

**Isle of Man.**—The tenth meeting was held on Feb. 3. The Chair was taken by the District Manager, who first explained some important points, held over from last meeting, on "Pot-heads," after which he introduced the lecturer, Mr. E. Cowley, Clerk, to read his paper on "The Measured Rate." The lecturer brought out most instructive points in the paper, and a good discussion took place. The Chairman impressed on those present the great importance of being well acquainted with all points of the measured rate, which was the coming rate.

The eleventh meeting was held on Feb. 17. The District Manager presided, and introduced Mr. J. King, Acting Gang Foreman, who gave a most interesting lecture on "Binding In, Terminating and Running Open Wires." The lecturer explained, by the aid of models and diagrams, the various systems, of making off,



binding in, and terminating, also some ingenious ways of getting wires over buildings, etc. Great interest was taken by all present in the many useful and interesting points so clearly brought out.

**Leeds.**—At the meeting held on Feb. 8 two papers were read, the first entitled "Some Types of Office Boys," by Mr. J. W. Walker, a junior member of the staff; and the second by Mr. T. W. Lawrence on "Operating," dealing mainly with the training of the operator, the public, and the staff. In the course of the paper it was stated that 71,233 valued calls were dealt with by the Central Exchange on a given day. The discussion on this paper was animated, being entered into by five ladies and ten gentlemen.

**Leeds Operators.**—A meeting of the operating staff of the Leeds central exchange took place on Feb. 1, when the Traffic Manager, Mr. J. H. Swain, gave an address on the past, present, and future service. A very animated and profitable discussion took place, and the meeting was thoroughly enjoyed, and it is suggested further meetings should take place.

**Liverpool and Birkenhead.**—At the third meeting, held on Jan. 26, Mr. O. G. Lee presiding, Mr. A. Ward read a paper on "Common Battery Maintenance." Written by one who has an intimate knowledge of C.B. exchanges, the paper was exceedingly interesting and instructive. The subject is one of increasing importance in Liverpool, and the general interest was fully confirmed by a lively discussion, participated in by a large number of members, concerning this wide and useful subject from many and diverse points of view.

**Liverpool and Birkenhead Operators.**—The fifth meeting was held on Feb. 14, Miss E. M. Jones presiding. Miss Briggs, of the Manchester Traffic Department, read a paper entitled "The Operating School." The paper was illustrated by lantern slides. An interesting and animated discussion followed the reading of the paper, terminating in Mr. Prout's proposing a vote of thanks and congratulating Miss Briggs on the excellence of her paper, and the very able manner in which she dealt with the various questions put to her. The society was pleased to welcome the Traffic Manager and Travelling Supervisor of Manchester, in addition to Miss Briggs. One or two musical items terminated a very successful meeting.

**Manchester.**—The fifth paper of the session was read on Jan. 20 by Mr. H. Elliott, Contract Manager, on "Development," the vice-president (Mr. G. F. Staite) presiding. Mr. Elliott explained the duties of an officer engaged on development studies, pointing out the great care which is necessary in his investigations, and gave comparisons of the development of telephone service in the United States and England, and expressed the opinion that in the near future the development in this country would be much greater than it had ever been in the past. The paper, which was very interesting, was followed by a good discussion.

**North-Eastern (London).**—A meeting was held on Jan. 30 at Dalston Exchange, the chairman being Mr. F. Morley-Ward, when a paper was read by Mr. G. J. Gawthorne on "Incandescent Lamps," in the course of which he gave a very interesting and instructive account of how the electric lamp was first evolved, the progress since made, the various metals used, the formation, and the methods employed to prepare them for use, and also some records and observations kept of lamps at Dalston Exchange.

**Nottingham.**—The third meeting was held on Jan. 27, Mr. H. Saywell occupying the chair. An interesting paper was read by Mr. G. F. Aked on "Sub-Exchange Construction and Maintenance," the subject being illustrated by slides. Subsequently a discussion took place, a good many of those present taking part. A prize awarded by Mr. C. H. Sibley was presented to Miss Brook for a paper on "Operating," read at the last meeting.

**Nottingham Factory.**—The fourth meeting of the session was held on Jan. 13, when the official reader, Mr. H. Wilcockson, read Mr. C. Hope's paper on "The Nature and Composition of Metals used in Telephony." The metals treated included copper, iron, German silver, zinc, platinum, nickel, cobalt, aluminium and magnesium. The making of spelter for brazing purposes was also touched on. A prize having been offered for the best question sent in calculated to elicit information of most value to the workshop staff, about three dozen questions had been submitted. These had been handed out to members of the Company's staff considered best qualified to write replies, and the questions, together with the replies, were read out at the meeting by the secretary, and proved both interesting and instructive.

On Feb. 10 the society was favoured with a visit from Mr. C. T. Peacock, of the Engineer-in-Chief's Department, Head Office, who gave an extremely valuable lecture, illustrated by slides and apparatus, on "Improvements in Telephonic Apparatus." The improvements dealt with were mainly those adopted by the Company during the last eighteen months, and their description was very much appreciated, as was evidenced by the excellent discussion which followed, Mr. Peacock's answers to the questions put to him being most instructive.

**Oldham.**—On Feb. 9 a paper was read by Mr. H. J. Corke, Local Manager, Ashton-under-Lyne, entitled "Operators and Operating." Sixteen members of the society were present, and also eighteen of the operating staff. In the absence of the president (Mr. J. Cleary), who is away on inventory work, the chair was taken by Mr. Pugh, District Manager. Mr. Corke dealt with his subject in a very interesting and able manner, and at the close of the lecture a discussion ensued, in which Miss Turner and Messrs. Pugh, Hart and Croasdale took part.

**Paisley.**—The third meeting of this society was held on Feb. 1, when a very interesting paper by Mr. W. A. Frame, entitled "Reflections," was read by Mr. A. W. Grant. The paper was thoroughly enjoyed by everyone present. There was a good turn-out of members.

**Plymouth.**—A paper was given on Jan. 25 by Mr. A. E. Ball, Chief Clerk, entitled "Office Organisation," which dealt with the essential qualities of a good clerk, his training, etc. The paper was followed by a useful discussion.

**Sheffield.**—The fourth meeting of this society was held on Jan. 18, the chair being taken by Mr. A. Broomhead. Papers were read by the following members of the local staff:—Messrs. Bowring, Cheatham, Christie, Skinner, Rhine, on "Works Orders, Defects or Improvements," representing the of the different departments. The matter of the papers had been well

thought out, many interesting points were raised and considerable discussion took place at the close of the meeting.

**Sheffield Operators.**—The fourth meeting of this society was held on Jan. 26, and took the form of a competitive night for the junior operators (operators having been four years and under in the Company's service). The chair was taken by the Traffic Manager (Mr. E. J. Johnson). Papers were read by eight of the junior members as follows:—"A Day of Eight O'clock Duty," by Miss G. Ardin. "The Working of a Sub-Exchange," by Miss W. Nield. "Some Difficulties in Operating," by Miss N. James. "The Work of a Test Operator," by Miss M. Sleath. "My Experience at a Sub-Exchange," by Miss P. Somerfield. "Two and a Half-Years' Experience at a Private Branch Exchange," by Miss C. Simmons. "Sub-Exchanges *versus* Central Exchange," by Miss N. Thornton. "Operating," by Miss Widdowson. The first prize, presented by the vice-president, was awarded to Miss N. James. The second prize, a case of tea spoons, presented by the supervisors, was awarded to Miss G. Ardin. The third prize, a serviette ring, presented by the Clerk-in-Charge, was awarded to Miss W. Nield. The prizes were presented by the Clerk-in-Charge (Miss L. Ibbotson).

The fifth meeting of the Sheffield Telephone and Operators' Telephone Societies were combined and held on Feb. 16, the chair being taken by the Traffic Manager (Mr. E. J. Johnson). A paper was read by Mr. W. Napier (Engineers-in-Chief's Department) on "Traffic." The subject was dealt with in an interesting and instructive manner, being illustrated by numerous interesting slides. Time did not admit of a lengthy discussion at the close of the meeting, but some interesting points were raised by the District Manager and the Exchange Manager, which were suitably replied to.

**Southampton Operators.**—The third meeting of the session was held on Jan. 26, when the following papers were given by operators:—Miss Scott on "P.B.X. Working," Miss L. Haynes on "P.B.X. Working," Miss Reid on "Use of Vibrators," Miss Davidge on "Operating Generally," Miss Turner on "Enquiries and Party Line Recording," Miss Morris on "Operating Difficulties." The whole of the papers were considerably above the average, and were keenly appreciated. Over 50 per cent. of the members entered into the debate, and prizes were given, one for the best paper with the most useful points, and one for the best show in debate, the prizes being carried off by Miss Morris and Miss Turner respectively. The chair was taken by Miss Hoare, the Clerk-in-Charge.

**Swansea Operators.**—The fifth sessional meeting was held on Feb. 8, Mr. W. J. Hodgetts (vice-president of the society) occupying the chair. An interesting and instructive lecture was given by Mr. A. G. Bristow (Traffic Manager), entitled "Sound Waves and their Application to Telephone Work." The fundamental principles of sound were demonstrated by means of some interesting practical experiments and illustrations of the waves produced when various vowels and words were expressed, were shown by means of lantern slides. The lecture was much appreciated by a good attendance of members.

**Swansea.**—The fifth sessional meeting took place on Feb. 15, Mr. W. E. Gauntlett (District Manager) occupying the chair, when Mr. A. G. Bristow (Traffic Manager) repeated his lecture on "Sound Waves."

**Sunderland and Shields.**—A meeting was held on Jan. 25, Mr. W. J. Douglass presiding. A paper on "Works Orders" was given by Messrs. Hall and Vernon, followed by a discussion in which the undermentioned took part: Messrs. W. J. Douglass, E. Spink, J. G. Dixon, R. Guthrie and J. Martin.

**Torquay.**—The sixth meeting was held on Jan. 30, when papers were read by the Misses Rowe and Harding on "Some Notes on Operating," which were exceedingly good. The chief point brought forward was the necessity of educating the subscriber. A good discussion followed the reading, and at the close of this Mr. P. Bovey read a paper entitled "Line Faults, their Cause and Remedy," which evoked great interest amongst the members of the line staff. An animated discussion followed on points raised.

**Western (Metropolitan).**—The fourth meeting of the session was held at Gerrard Exchange on Jan. 26 last, when a paper on "Combined Test and Fault Clerk's Duties," by Messrs. W. A. Stradling and F. C. Taylor was read. The paper gave a good description of the combined duties which had been in operation for some months past, and the advantages and disadvantages of the new system were clearly set out. An interesting discussion took place at the conclusion of the reading.

**Weymouth.**—The second meeting of the session, held on Dec. 15, was attended by 70 per cent. of the members in addition to a number of visitors. The Local Manager, Mr. Attwooll, gave a paper on "Line Work," illustrated by a series of lantern slides, Mr. Braithwaite, the Chief Inspector, taking the chair. The line staff was strongly represented, and contributed to an animated and interesting debate.

At the third meeting, which was held on Jan. 12, a paper on "Traffic" was given by Mr. S. O. Allen, the recently appointed Traffic Manager for Hants and Dorset, and as this was the first occasion on which Mr. Allen had given a paper to the Weymouth Society, his visit was much appreciated. Mr. Allen's paper was both interesting and topical, the speaker having given due regard to local conditions. The Chairman, Mr. Attwooll, after a vigorous discussion by the members, summed up in an instructive manner to an attendance of 82 per cent. of the total membership.

The fourth meeting of the society, held on Feb. 9, provided a thoroughly instructive evening, Mr. Braithwaite, the Chief Inspector, giving a paper on "Exchange Equipment," which was illustrated by a number of slides descriptive of central battery exchanges. As the lecturer has the advantage of a considerable experience in C.B. working, he handled his subject in an intelligent and comprehensive manner, his paper being in every sense educative. The Local Manager presided over an attendance of 93 per cent. of the total membership, this being the largest attendance of the session.

**Wolverhampton.**—On Feb. 3 a paper was given by Mr. W. Bentley on "Curve Plotting and the Slide Rule." Their advantages were very lucidly explained by the lecturer, and the paper was keenly followed by the audience present, numbering about 40. The chair was occupied by Mr. R. W. Lloyd.